# BIENNIAL REPORT
# DEPARTMENT OF AGRICULTURE

NORTH CAROLINA

1920 - 1922

BIENNIAL REPORT

*of the*

# North Carolina Department of Agriculture

From December 1, 1920
To November 30, 1922

RALEIGH
COMMERCIAL PRINTING COMPANY
STATE PRINTERS
1923

## LETTER OF TRANSMITTAL

January 5, 1923.

SIR:

I have the honor to submit herewith Biennial Report of the Department of Agriculture for the years 1921 and 1922.

W. A. Graham

*Commissioner of Agriculture.*

To His Excellency, CAMERON MORRISON,
*Governor of North Carolina.*

1. W. A. Graham, Commissioner, ex officio Chairman
2. F. P. Latham, First District
3. J. J. Harris, Second District
4. R. L. Woodard, Third District
5. Clarence Poe, Fourth District
6. K. W. Barnes, Secretary and Purchasing Agent

MEMBERS STATE BOARD OF AGRICULTURE


1. C. C. Wright, Seventh District
2. R. W. Scott, Fifth District
3. A. T. McCallum, Sixth District
4. W. B. McLelland, Eighth District
5. H. Q. Alexander, Ninth District
6. A. Cannon, Tenth District

MEMBERS STATE BOARD OF AGRICULTURE

# OFFICIALS AND EMPLOYEES OF THE STATE DEPARTMENT OF AGRICULTURE

## STATE BOARD OF AGRICULTURE

W. A. GRAHAM, Commissioner, *ex officio* Chairman, Raleigh

F. P. LATHAM, Belhaven---First District
J. J. HARRIS, Macon---Second District
R. L. WOODARD, Pamlico---Third District
CLARENCE POE, Raleigh---Fourth District
R. W. SCOTT, Haw River---Fifth District
A. T. MCCALLUM, Red Springs---Sixth District
C. C. WRIGHT, Hunting Creek---Seventh District
W. B. MCLELLAND, Stony Point---Eighth District
H. Q. ALEXANDER, Matthews---Ninth District
A. CANNON, Horse Shoe---Tenth District

## OFFICERS AND EMPLOYEES

### EXECUTIVE OFFICERS

W. A. GRAHAM---Commissioner
K. W. BARNES---Secretary and Purchasing Agent
MISS M. H. MCKIMMON---Bookkeeper
MISS MARY KNIGHT---Stenographer

### EXPERIMENT STATION AND EXTENSION SERVICE

B. W. KILGORE---Director
F. E. MILLER---Asst. Director Branch Experiment Stations
J. M. GRAY---Asst. Director Extension Service

### ANALYTICAL DIVISION

(Vacancy)---State Agricultural Chemist
W. G. HAYWOOD---Fertilizer Chemist
E. S. DEWAR---Assistant Chemist
B. C. WILLIAMS---Assistant Chemist
Z. B. BRADFORD---Assistant Chemist
C. L. WILLIAMS---Assistant Chemist
J. O. HALVERSON---Feed Chemist
L. M. NIXON---Assistant Chemist
B. NAIMAN---Assistant Chemist
MISS M. S. BIRDSONG---Secretary

### MUSEUM

H. H. BRIMLEY---Curator
HARRY T. DAVIS---Assistant
MISS ANNIE LEWIS---Usher

### VETERINARY DIVISION

WM. MOORE---Veterinarian
C. C. WATTS---Assistant
L. J. FAULHABER---Assistant
MRS. MARGARET N. SCHELL---Stenographer

### ANIMAL INDUSTRY DIVISION

R. S. CURTIS---Acting Chief
EARL HOSTELER---Assistant—Beef and Swine
F. T. PEDEN---Assistant—Beef and Cattle
W. W. SHAY---Swine Extension
GEORGE EVANS---Sheep Extension
B. F. KAUPP---Poultry Pathologist
A. G. OLIVER---Poultry Extension
E. G. WARDIN---Assistant in Poultry
STANLEY COMBS---Dairy Experimentalist
J. A. AREY---Dairy Farming
F. R. FARNHAM---Assistant Dairy Farming
A. C. KIMREY---Assistant Dairy Farming
MIS. NELLIE FORT---Stenographer
MISS JEAN SMITH---Stenographer
MISS MARGARET JONES---Stenographer

### DIVISION OF AGRONOMY

C. B. WILLIAMS---Chief
E. C. *BLAIR*---Extension Agronomist
R. Y. WINTERS---Plant Breeding Specialist
W. F. PATE---Agronomist in Soils
S. K. JACKSON---Assistant in Plant Breeding
G. M. GARREN---Assistant in Plant Breeding
S. W. HILL---Assistant in Plant Breeding
W. E. HEARN---State Soil Agent
S. O. PERKINS---Soil Survey
MRS. KATHRYN MCKIMMON---Secretary

### DIVISION OF ENTOMOLOGY

FRANKLIN SHERMAN---Entomologist
R. W. LIEBY---Assistant
C. S. BRIMLEY---Assistant
T. B. MITCHELL---Assistant
*W. B. MABEE---Extension
*C. L. SAMS---Specialist in Beekeeping
MISS ALMA MARION---Stenographer

### DIVISION OF HORTICULTURE

C. D. MATTHEWS---Horticulturist
L. H. NELSON---Assistant
*E. D. BOWDITCH---Assistant
*F. E. MCCALL---Garden Specialist
*R. F. PAYNE---Extension Horticulturist
MISS OWEN BISHOP---Extension Horticulturist
MRS. HARRY BLACK---Stenographer

### FOOD AND OIL DIVISION

W. M. ALLEN---State Food and Oil Chemist
L. B. RHODES---Assistant Chemist
MRS. L. B. RHODES---Assistant Chemist
W. A. QUEEN---Assistant
H. L. CROOK---Assistant
C. R. WARLICK---Oil Clerk
F. T. WARD---Food Inspector
MISS SARAH ALLEN---Clerk
MISS SALLIE PALMER---Stenographer

### DIVISION OF BOTANY

J. L. BURGESS---Botanist
MISS MARY SHORE---Assistant Botanist
MISS SUSIE ALLEN---Seed Analyst
MISS JESSIE KNIGHT---Assistant Seed Analyst

### FARM DEMONSTRATION WORK

C. R. HUDSON---State Agent
S. J. KIRBY---Assistant
MISS MERTIE MERRITT---Stenographer
MRS. RICHARD HINTON---Stenographer

### HOME DEMONSTRATION WORK

MRS. JANE S. MCKIMMON---State Agent
MISS MAUD E. WALLACE---Assistant State Agent
MISS EMMA YOUNG---Secretary
MISS ETTA PERRY---Stenographer

### MARKETS AND RURAL ORGANIZATIONS

B. F. BROWN---Chief
GORRELL SHUMAKER---Marketing Fruits and Vegetables
P. H. HART---Cotton Grading
J. I. JOHNSON---Assistant Cotton Grading
J. P. BROWN---Warehouse Inspection and Operation
R. O. MOEN---Credit Unions
V. W. LEWIS---Livestock Marketing Specialist
J. F. HATCH---Chief Clerk
M. R. STEPHENSON---Insurance Clerk
MISS CARY BACHELOR---Insurance Clerk
MISS MABEL HAYNES---Stenographer
MISS FRANCES DUNN---Stenographer
MRS. J. N. MASON---Stenographer

### DIVISION OF AGRICULTURAL ECONOMICS

FRANK PARKER---Agricultural Statistician
WM. H. RHODES---Assistant Statistician
MRS. KATHERINE W. HAIG---Record Clerk
MRS. ELLA R. SIMPSON---Filing Clerk
MISS ANNIE B. STAINBACK---Mailing Clerk
MRS. REBECCA W. HORTON---Census Clerk

### PUBLICATIONS

F. H. JETER---Agricultural Editor
A. O. ALFORD---Assistant in Charge of Distribution
MRS J. P. SWAIN---Stenographer
MISS THELMA OWENS---Clerk

### FARM ENGINEERING

E. R. RAINEY---Farm Building and Equipment
MISS LOUISE B. WRIGHT---Stenographer

### FARM FORESTRY

H. M. CURRAN---Farm Forestry Specialist

### TEST FARMS

R. E. CURRIN, JR.---Superintendent Edgecombe Test Farm, Rocky Mount, N. C.
F. T. MEACHAM----------Superintendent Iredell Test Farm, Statesville, N. C.
S. C. CLAPP----------Superintendent Buncombe Test Farm, Swannanoa, N. C.
CHAS. DEARING----------Superintendent Pender Test Farm, Willard, N. C.
E. C. MOSS ----------Superintendent Granville Test Farm, Oxford, N. C.
J. L. REA, JR.----------Superintendent Washington Farm, Wenona, N. C.

---

* All Experiment Station and Extension workers are in the employment and under the direction of the State Department of Agriculture and the State College of Agriculture and Engineering, this work being under the immediate direction of the Joint Committee for Agricultural Work.

# BIENNIAL REPORT

OF THE

# NORTH CAROLINA DEPARTMENT OF AGRICULTURE

## WORK OF THE NORTH CAROLINA DEPARTMENT OF AGRICULTURE

In addition to the detailed reports by divisions, included in this report, there are some things of outstanding importance to which attention should be directed. It is generally recognized that North Carolina is primarily an agricultural State. Its interests are largely rural and our people are a farming people. By close application to the problems confronting us, good progress is being made along all agricultural lines, and the Department workers feel they have rendered great assistance in this movement.

North Carolina holds her lead in the total value of field crops for 1922. With a rank of fourth, at $293,094,000, for the value of the 22 most important crops of the United States, and fifth in rank of all crops, valued at $342,637,000, this State, with a cultivated area less than 25 others, surpasses 43 States in the value of crops.

RANK OF 10 LEADING STATES IN VALUE OF 22 PRINCIPAL CROPS

(Crops: Corn, Wheat, Oats, Barley, Rye, Buckwheat, Flaxseed, Rice, Potatoes, Sweet Potatoes, all Hay, Tobacco, Lint Cotton, Broom Corn, Grain Sorghums, Hops, Oranges, Clover Seed, Peanuts, Cranberries, Apples.)

| *States* | *Rank* | | *Value 22 Crops* | |
|---|---|---|---|---|
| | 1922 | 1921 | 1922 | 1921 |
| Texas | 1 | 1 | $594,619,000 | $352,564,000 |
| Iowa | 2 | 3 | 418,404,000 | 335,130,000 |
| Illinois | 3 | 2 | 386,017,000 | 272,909,000 |
| North Carolina | 4 | 4 | 298,094,000 | 219,567,000 |
| Kansas | 5 | 6 | 263,263,000 | 206,302,000 |
| Minnesota | 6 | 8 | 253,460,000 | 186,775,000 |
| Nebraska | 7 | 13 | 246,866,000 | 166,977,000 |
| Missouri | 8 | 12 | 245,855,000 | 172,813,000 |
| Ohio | 9 | 9 | 244,594,000 | 184,682,000 |
| California | 10 | 11 | 226,170,000 | 174,991,000 |

RANK OF 10 LEADING STATES IN VALUE OF ALL CROPS

| States | Rank 1922 | Rank 1921 | Value 22 Crops 1922 | Value 22 Crops 1921 |
|---|---|---|---|---|
| Texas | 1 | 1 | $716,408,000 | $424,776,000 |
| Iowa | 2 | 5 | 454,787,000 | 255,576,000 |
| Illinois | 3 | 3 | 419,584,000 | 296,640,000 |
| California | 4 | 2 | 418,833,000 | 324,057,000 |
| North Carolina | 5 | 6 | 342,637,000 | 252,376,000 |
| Kansas | 6 | 8 | 289,696,000 | 226,705,000 |
| Minnesota | 7 | 11 | 284,143,000 | 209,860,000 |
| Ohio | 8 | 10 | 281,143,000 | 212,278,000 |
| New York | 9 | 4 | 276,857,000 | 272,473,000 |
| Missouri | 10 | 12 | 276,242,000 | 194,172,000 |

In the crop value indicated, there is not included the value of livestock, timber, improvements or land values. Such a high rank is of considerable credit to the Tarheel State, even if most of the credit is due to cotton and tobacco. It should be recalled that the Middle Western progressive farming States had good crops and better prices for grain than last year. That we also improved is evident from the $80,000,000 increase in crop value over last year, or about 25 per cent. Last year's crops showed a decrease of $90,000,000 from the 1920 value. The 1919 census valuation was $503,229,000, when we ranked eleventh in total value.

The State has advanced in ten years from the twenty-third to the fifth place in rank in value of all farm crops, and ranks first in value of tobacco, peanuts, sweet potatoes, soy beans, and in the average acre-yield of cotton.

All of the agricultural institutions in North Carolina have helped to promote this increase in farm prosperity, and the State Department of Agriculture has gladly cooperated with them in this work, giving liberally of its means, the time of its workers and its resources to aid the agricultural progress of the State, while the time-honored service of the Department, the regulatory work of inspecting fertilizers, seeds, feedstuffs, oils and foodstuffs has saved the farmers of this State many thousands of dollars and has put into the general treasury of the State much money that is used for the running expenses of the State. This inspection work is paid for by the industries regulated, and provides most of the funds for carrying on agricultural work in the State, as well as for the State's offset to the Federal appropriation for Agricultural Extension work.

Crop statistics is an important item for any State. The gathering and dissemination of this information in North Carolina has been developed into one of the best services to be found anywhere in the Union. The Department feels that the State should know the status of its agriculture and is lending every aid to make the crop figures gathered by the Statistical Division as accurate and trustworthy as possible.

## SUMMARY OF STATE CROPS

| CROPS | | ACREAGE | YIELD PER ACRE | PRODUCTION | PRICE PER UNIT | VALUE $ |
|---|---|---|---|---|---|---|
| Cotton | 1922 | 1,626,000 | 250 lbs. | 852,000 bales | $ .245 | $104,370,000 |
| | 1921 | 1,403,000 | 264 lbs. | 776,000 bales | .164 | 63,650,000 |
| Tobacco | 1922 | 515,000 | 596 lbs. | 306,940,000 lbs. | .303 | 93,008,000 |
| | 1921 | 450,000 | 561 lbs. | 252,050,000 lbs. | .260 | 65,637,000 |
| Corn | 1922 | 2,526,000 | 20.0 bu. | 50,520,000 bu. | .89 | 44,963,000 |
| | 1921 | 2,552,000 | 19.3 bu. | 49,254,000 bu. | .78 | 38,418,000 |
| Hay (all) | 1922 | 845,000 | 1.39 tons | 1,174,000 tons | 18.08 | 21,221,000 |
| | 1921 | 732,000 | 1.28 tons | 939,000 tons | 11.50 | 18,307,000 |
| Sweet Potatoes | 1922 | 110,000 | 113 bu. | 12,430,000 bu. | .80 | 9,944,000 |
| | 1921 | 102,000 | 101 bu. | 10,302,000 bu. | .97 | 9,993,000 |
| Wheat | 1922 | 612,000 | 9.0 bu. | 5,508,000 bu. | 1.36 | 7,491,000 |
| | 1921 | 600,000 | 7.5 bu. | 4,500,000 bu. | 1.44 | 6,480,000 |
| Apples (trees) | 1922 | 4,105,446 | ---------- | 5,570,000 bu. | .90 | 5,013,000 |
| | 1921 | 3,824,000 | ---------- | 593,000 bu. | 2.50 | 1,482,500 |
| Potatoes (I) | 1922 | 48,000 | 94 bu. | 4,512,000 bu. | 1.01 | 4,557,000 |
| | 1921 | 46,000 | 88 bu. | 4,048,000 bu. | 1.43 | 5,789,000 |
| Peanuts | 1922 | 127,000 | 895 lbs. | 113,665,000 lbs. | .04 | 4,547,000 |
| | 1921 | 141,000 | 919 bu. | 129,579,000 lbs. | .056 | 7,256,000 |
| Soy Beans | 1922 | 80,000 | 16.5 bu. | 1,320,000 bu. | 1.95 | 2,574,000 |
| | 1921 | 74,000 | 16.0 bu. | 1,184,000 bu. | 1.80 | 2,131,000 |
| Oats | 1922 | 178,000 | 21 bu. | 3,387,000 bu. | .67 | 2,504,000 |
| | 1921 | 170,000 | 18 bu. | 3,060,000 bu. | .70 | 2,142,000 |
| Sorghum Syrup | 1922 | 30,000 | 68 gal. | 2,940,000 gal. | .80 | 2,352,000 |
| | 1921 | 32,000 | 64 gal. | 3,008,000 gal. | .78 | 2,346,000 |
| Peaches (trees) | 1922 | 2,560,000 | ---------- | 1,008,000 bu. | 1.96 | 1,975,680 |
| | 1921 | 2,300,000 | | 644,000 bu. | 2.65 | 1,706,600 |
| Cow Peas | 1922 | 80,000 | 10.0 bu. | 800,000 bu. | 1.79 | 1,432,000 |
| | 1921 | 93,000 | 8.02 bu. | 762,600 bu. | 2.17 | 1,654,842 |
| Rye | 1922 | 40,000 | 8 bu. | 320,000 bu. | 1.20 | 384,000 |
| | 1921 | 39,000 | 7 bu. | 273,000 bu. | 1.25 | 341,000 |
| Clover Seed | 1922 | 8,800 | 2.6 bu. | 22,880 bu. | 10.08 | 230,630 |
| | 1921 | 8,000 | 2.8 bu. | 22,400 bu. | 10.75 | 240,800 |
| Pears (trees) | 1922 | 235,000 | ---------- | 110,000 bu. | 1.30 | 143,000 |
| | 1921 | 231,000 | ---------- | 100,000 bu. | 1.82 | 182,000 |
| Buckwheat | 1922 | 5,000 | 20 bu. | 100,000 bu. | .97 | 97,000 |
| | 1921 | 5,000 | 17 bu. | 85,000 bu. | .85 | 72,000 |
| Beans | 1922 | 2,119 | 4.5 bu. | 9,536 bu. | 3.36 | 32,000 |
| | 1921 | 2,230 | 5.0 bu. | 11,150 bu. | 2.67 | 29,771 |
| Barley | 1922 | 500 | 8.5 bu. | 4,250 bu. | .51 | 2,550 |
| | 1921 | 400 | 8.0 bu. | 3,360 bu. | ---------- | ---------- |

In order to greatly increase their efficiency, the Department of Agriculture has begun a comprehensive building program on the seven branch station farms. At the Mountain Station a magnificent poultry plant has been erected, together with several good houses for the laborers. A good dairy barn and other out-buildings have also been completed on this farm. The same is true of the other farms, and an effort is being made to have them reach the highest point of efficiency in serving their particular sections.

Recently the Board of Agriculture turned over the old Serum Plant farm, near Raleigh, to the Animal Industry Division, for more extended tests with swine. This will make the eighth branch station farm now being operated with Department funds.

As usual, the Department fostered the work with women, and no more outstanding piece of work in the South has been done than that accomplished this past year by the Home Demonstration Division in establishing curb markets and stall markets for the rural women. This is, of course, in addition to the regular work of the Division in home making, canning, clothing and home ground beautification, and club work.

Keenly alive to the needs of the cotton farmer, the Division of Entomology has done some good work in its demonstrations in boll weevil control methods in the southern counties of the State. With an investment of about $5 per acre in poisons, this Division shows that a profit of about $25 per acre may be expected, where the work is done correctly. In the sandhill section, this Division also did some notable work in helping to save the peach crop from injury by insect pests. Tests made showed that sprayed fruit was only about six per cent wormy, while the unsprayed was about 38 per cent wormy.

The Division of Horticulture has done much good work in promoting home gardens and in producing more and better fruit in the State. How to prune fruit trees properly has been another project of this Division that has been profitable of results. Much help has also been given to the orderly marketing of sweet potatoes.

The eradication of the cattle tick is again one of the serious problems of the livestock industry. Only a small part of the State remains to be freed from this pest, and it is hoped that this good work will soon be finished. The Veterinary Division is cooperating with the Federal Department of Agriculture to eradicate the tick. This division is also doing good work in controlling livestock diseases and in handling the livestock sanitary regulations of the State. A comprehensive campaign for the eradication of tuberculosis in cattle has been conducted during the past two years, and is now making good progress.

The Animal Industry Division is continuing its interesting work in studying the best methods of feeding various classes of livestock. Some notable results are being secured on the different farms along all lines of livestock investigations.

The department was also one of the first in the South to recognize the need for better farm marketing facilities, and from a small beginning, about eight years ago, now has developed one of the strongest Marketing Divisions to be found in the South. Its work has been outstanding during the past two years. Cooperative shipments have done much to teach farmers the value of cooperation and have led to the larger undertaking by the organized farmers of the State.

When the Department of Agriculture was organized in 1877 it was housed in, perhaps, the worst public building in Raleigh, an old, condemned and abandoned hotel. This old hotel, a fire trap for our Museum and records, was the home of the Department till a few months ago, when it was torn down to make room for the magnificent new structure that is now going up. North Carolina agriculture will soon have a home in Raleigh of which the farmers may justly be proud.

The publication of the North Carolina Handbook by the State Department is now nearing completion, and it is hoped we may be able to place a copy of it in your hands within the next thirty days. This Handbook will present a resume of the different lines of economic forces in operation in North Carolina at this time, and it is expected to be of great value in conveying information to any and all parties in any way interested in the welfare of North Carolina.

Due to the straightened financial condition existing among the farmers at this time, it has been found best to close down the State Limestone Pulverizing Plant at Bridgeport, Tenn., for an indefinite period.

The following Board members' time will expire March 1, 1923: R. L. Woodard, Third District; A. T. McCallum, Sixth District, and H. Q. Alexander, Ninth District.

The following reports show in detail the work of the various divisions.

# ANALYTICAL DIVISION

The position of State Agricultural Chemist, made vacant some time ago by resignation, has not been filled, and the work of the Analytical Division has been carried on under the direction of Mr. W. G. Haywood for fertilizers, and Dr. J. O. Halverson for feeds, and I have given advisory assistance where needed, and am preparing this report by agreement, because of the existing situation.

## Chemical Work

The amount and kind of chemical work done in the laboratory during the two years, December 1, 1920, to November 30, 1922, is given in the following summary of analyses made in that time:

| | |
|---|---|
| Official samples of fertilizers | 3,000 |
| Fertilizers and fertilizer materials for farmers | 493 |
| Cotton seed meal | 750 |
| Limes, limestones and marls | 175 |
| Concentrated stock feeds | 1,000 |
| Soils | 255 |
| Mineral waters | 75 |
| Poison cases (animals) | 25 |
| Miscellaneous | 60 |
| Total | 5,833 |

There has been considerable inconvenience and delay in getting out analyses on account of change of laboratories from the old Agricultural Building to the present temporary quarters in the Museum Building, and there will of necessity be some delay until the work can be gotten into the new building, where reasonably adequate space and equipment are being provided for doing this part of the Department work in a very thorough way. Very careful thought is being given to the proper equipment of the new laboratories so as to provide for efficient and increased service for the future.

In addition to the regular analyses of fertilizers, feeds, cotton seed meal, and other products, examined in accordance with State laws, a great deal of miscellaneous work for farmers and citizens generally of the State has been done, including analyses, both chemical and microscopical, of samples of soil collected in the soil survey work of the State.

B. W. Kilgore, *Director.*

# EXPERIMENTAL AND EXTENSION WORK

Investigation and research, the finding of new and important facts about farming, and the placing of these facts into the hands of the workers of the Agricultural Extension Service so that they may be transmitted by demonstration and other means to the farmers of North Carolina, is the function of the North Carolina Agricultural Experiment Station. Most of this research is done in the laboratories of the Central Station at the State College and State Department of Agriculture, and on the experimental plats of the Central Station farm and those of the seven branch stations now maintained by the Department and College.

The Station is especially favorably situated to meet the needs of farmers all over the State. Six of the branch stations, or test farms, as they are known locally, are located on the main soil regions of the State, and the experiments conducted on each of them are concerned mainly with the problems of that particular region. The station endeavors to solve those questions of vital importance to North Carolina farmers and to establish certain definite truths that will be of value, whether these results are negative or positive.

Recently, a new station has been added to study problems of swine production. It is felt that the establishment of this station will be of great advantage to North Carolina on account of the increasing interest in swine production over the State.

Central Station, *Raleigh.* — Projects of a strictly research nature are carried on at this station, as it offers better equipped laboratories for technical studies and, then, the specialists have the opportunity of following their investigations more closely. The more general farm problems are also dealt with here, leaving those of local importance to one or more of the branch stations, as conditions would justify.

The projects of the Horticulture, Entomology and Poultry departments have been carried forward and additional information has been secured. The seed selection and plant breeding work of the Agronomy Division has been outstanding, and the new strains developed here are meeting with much favor over the state where they have been tested. The major project of the Animal Industry Division, in determining the effect of cotton seed meal upon the growth and reproduction of dairy cows, shows that feeding excessive amounts of cotton seed meal causes abortion, weak calves and soft bone. The milk produced from cows receiving such rations fails to produce normal growth with calves. This test will have much bearing on the amounts of cotton seed meal that can safely be used in dairy rations.

Swine Station, *Raleigh.*—The old serum plant, just south of Raleigh, has been released by the Veterinary Division for swine investi-

gations. The plant has been remodeled and is now properly equipped, and the following swine experiments are under way:

To determine the length of time necessary to make pigs soft on peanuts, and the length of time necessary to harden them after they have been made soft:

To determine if the weight of "soft pigs" is the factor in "hardening" the carcass.

Further studies in the effect on the growth of feeding various amounts of peanuts in the growing ration for pigs is being carried on, and other feeding tests in connection with pasture crops are being planned. The farm of thirty-seven acres is being arranged into a system of pastures and feeding lots, and, when finished, the plant, as a whole, will be quite suitable for swine investigation.

Improvements added during the year:

New two-room house for labor, remodeling dwelling for foreman, new barn, and rearranging all brick buildings for handling the swine work.

BLACKLAND STATION, *Wenona.*—Since the establishment of this station, in 1913, a great deal of the work has been along the lines of development, and much information has been obtained regarding methods of clearing the cut-over land in the Wenona section, and drainage. At present, 120 acres of the station lands are tile drained and under cultivation. This leaves eighty acres on the farm uncleared, and it is the plan to clean up as much of this land as possible during the winter months, after the crops are harvested.

The experiments with lime, fertilizers, pasture mixtures, soy beans, cowpeas, truck crops, cultural practices and seed improvement were continued last year, with good results. The lime test further proved that lime is the controlling element for good crop results after drainage, and that finely ground limestone is better than marl or hydrated lime. Soy beans and cowpeas made good growth on lands which were limed at the rate of two tons of finely ground limestone per acre.

Corn has been the main money crop grown so far in this section, but the practice of continuous cropping with corn is beginning to register trouble. Information is needed on crops that can be grown in rotation with corn, and with this in mind, a three-year rotation experiment was started last spring; first year corn, second year spring oats followed by soy beans for seed or hay, third year Irish potatoes followed by soy beans for seed or hay.

With the low price of corn and the need of other methods for corn in the section, a hog feeding experiment was started on this station last January. One hundred and thirty-five feeder pigs were purchased from South Georgia, averaging 96 pounds each. The pigs were divided into two lots, and fed as follows:

Lot one—Shelled corn and fish meal in separate compartments of self-feeders.

Lot two—Shelled corn and tankage in separate compartments of self-feeders.

The results of the feeding test show that fish meal and shelled corn are better than tankage and shelled corn from the standpoint of gain and cost. The cost per hundred-pound gain with the fish meal lot was $5.14 against $5.83 per hundred-pound gain with the tankage lot.

The hogs were later sold at a net profit of $227.60; or, instead of receiving 65 cents per bushel for our corn, we "drove it" to market and received $1.10 per bushel.

Further tests to determine the best grazing crops for swine in this section have been started, and the necessary equipment has been provided. Eight brood sows and their litters will be used in these tests.

The items of permanent improvement undertaken during the past year are as follows:

New five-room dwelling for labor, completion of 2500-bushel corn crib, water system connecting with barn, hog lots and dwellings; six farrowing houses for brood sows, and new system of fencing around hog lots and pastures.

COASTAL PLAIN STATION, *Willard.*—The extensive Muscadine grape work which is conducted here in cooperation with the U. S. Department of Agriculture has been carried forward with increased efficiency. The pruning experiments were especially noticeable this year in relation to the yield of grapes and their quality from the different methods used. The young commercial vineyard of four acres has been trellised, and a system of inter-cropping is under way. The grape utilization work has been continued, and a portion of the 1922 grape crop will be marketed in the form of grape juice, jelly and marmalade.

The Jersey herd developed on this farm has made progress during the year, and several outstanding records were made. During July, 1922, Pender Eminent Lass E, No. 369040, completed her A.A. record of 13,744 pounds of milk and 792.48 pounds of fat, entitling her to the A. J. C. C. Gold Medal. The record completed the requirements whereby Eminent 19th (her sire) became a Gold Medal bull. He is the only Gold Medal bull in the South, and one of twenty-four in the United States of America. Lass E's record makes her State Champion Cow over all breeds. She also holds the Junior Four-Year-Old Jersey Class Record for North Carolina.

During February, 1922, Pender Girl's Delia, No. 428960, completed a test, with 9,982 pounds of milk and 521.69 pounds of fat. This record was made at the age of two years and three months, and entitles her to A. J. C. C. Silver Medal, it being the first ever awarded a cow in North Carolina. Pender Eminent Lass L, No. 369016, holds State Senior Three-Year-Old Class record, with 12,018 pounds of milk and 597.35 pounds of fat. Pender Eminent Lass G, No. 407986, has just completed a record of approximately 650 pounds of fat, which gives

her second place in the Senior Four-Year-Old Class record for North Carolina.

MILK AND BUTTER FAT PRODUCTION THIS YEAR

| | |
|---|---|
| Average number of animals in the milking herd | 23 |
| Total amount of milk produced | 139,127.5 lbs. |
| Total amount of butter fat produced | 7,278.77 lbs. |

The average production for the past year was 6,229.5 pounds of milk and 325.9 pounds of fat. This is an increase of 20 pounds of fat per cow over the year preceding.

A commercial project has been added to the experimental poultry work here, and information is secured on the cost of raising broilers for market. The poultry plant has been enlarged to provide for this new project.

The poultry feeding experiments show clearly that pullets, to be strong, produce liveable chicks, and to commence laying early and to stand up under heavy laying, must be given animal food during the growing period. The fattening experiments show that it pays to fatten frying chickens before sending them to market, because it increases their quality and value. If the same price was obtained for the birds fattened and for those not fattened, it would still pay to fatten them, for the increase in weight would be profitable above the cost of producing the increased weight. It is further found that fryers from 2 to 3 pounds make greater gains in the ten-day fattening period than larger birds.

The sweet potato seed selection work by the Horticultural Division has made much progress, and last spring two hundred bushels of the improved strains of the Porto Rico and Nancy Hall varieties were distributed to sweet potato growers in the eastern part of the State. A good crop of pecans has just been harvested from the variety pecan orchard, and valuable information secured on varieties suitable to the Willard section.

The fertilizer, rotations, seed selections and cotton anthracnose projects have been continued with good results.

Permanent improvements added during the year are as follows:

New implement shed, 34x60, with loft above for storage; clearing the main dairy pasture and seeding fifteen acres to carpet grass and lespedeza; tile draining eight acres on the new land, which takes in the four-acre commercial vineyard; new range house for poultry plant. The work of tile draining the twenty-five acre central pasture is now under way, and new fences are being built around the dairy lots.

EDGECOMBE STATION, *Kingsboro.* — The experimental work at this station was curtailed early last spring, and the farm has been handled in view of improving our lands, equipment, and readjusting our cropping system to meet the boll weevil. A large portion of the waste lands on the back side of the farm have been worked over and brought under cultivation. The drainage system has been improved,

but additional drainage is necessary on the lower side of the farm before these lands can be properly handled. The farm buildings have been repaired and painted, and new farm implements have been purchased. The general farm crops have been handled in a more demonstrative way, with a plan for studying diversifications, rotations, cultural methods, cover crops, pasture crops for hogs, and securing production costs.

*Field D.*—The agronomy rotation experiment has been continued during the year, and further information has been obtained on well planned rotations against continuous cropping with corn or cotton.

The improvement and introduction of the Mexican Big Boll Cotton in this section by the Agronomy Division has given splendid results. Many of the leading farmers in Edgecombe County and that vicinity are now growing this variety and are highly pleased with the yield and staple. The station planted thirty-five acres this year, using selected seed from the previous crops, and averaged one and one-half bales per acre. The seed from the entire 1922 crop have been engaged in advance for planting purposes.

A herd of pure bred Hampshire hogs, consisting of eight sows and a boar, has been purchased for the farm. These hogs will be handled under best methods in determining the cost of carrying a pure bred herd under average farm conditions. A system of pastures and other necessary equipment is being provided.

The variety pecan orchard yielded about forty per cent crop this fall, and further information was secured on varieties best suited to the Edgecombe section.

Permanent improvements added during the year:

Twenty-five hundred bushel sweet potato storage house, with pecan curing room combined; new system of fences for the entire farm; repairing and painting all farm buildings.

MOUNTAIN STATION, *Swannanoa.*—In addition to carrying forward the outlined experimental projects and the general farm work, several new projects and many improvements have been undertaken during the year.

Until this year, the experimental work here consisted of agronomy fertilizer and rotation tests; seed improvement and selections; variety studies of soybeans, Irish potatoes and cabbage; truck crop production; variety and pruning investigations with apples and home plantings of small fruits. Much valuable information has been secured from these projects, which is generally followed by the mountain farmers.

The new poultry work taken up last spring is to deal with poultry problems peculiar to mountain sections, and a thoroughly modern poultry plant has been provided to carry the work forward. The poultry experiments will deal with the following problems:

1. "Studies in building up a farm flock." The breeding flocks, two in number, consist of Single Comb Rhode Island Reds and Single Comb

White Leghorns. The two flocks are to be built up to 150 hens each, with 12 cocks.

2. Feeding tests are being conducted to determine the kinds and amounts of feed for the breeding flocks.

3. The range experiments will be to determine the method of handling and suitability of different pasture crops for chickens in the mountain section of the State.

4. Commencing with the year 1923, one unit of 500 Single Comb White Leghorns are to be maintained as an experimental commercial unit.

5. Incubation experiments in connection with the two breeding flocks will be carried on in view of developing high producing flocks.

6. Studies in determining the cost of putting birds into the laying house by November 1st will be conducted.

7. Fattening tests will be conducted, to determine the value of milk feeding young chickens before marketing.

8. Studies will be made in the cost of marketing poultry and eggs.

This poultry plant is creating a great deal of interest in the mountain section, and when well under way should be the source for poultry information in the western part of the State.

This station is now equipped to handle the dairy work, with the exception of the milk house, and this is now being constructed. The dairy barn is complete, with concrete floor and mangers, the necessary water connections and drains, and stanchions to accommodate 28 animals. The hundred-ton silo is filled with good ensilage, and the necessary pastures have been provided. Arrangements for shipping a dairy herd to this station are now being completed.

Improvement items added during the year:

A 34x60 implement shed, with loft above for storage; new water system, connecting with four dwellings, poultry plant and dairy; one hundred-ton concrete silo; concrete floor and manger, twenty-eight stanchions and partitions in dairy barn; concrete septic tank, connecting with dairy barn; poultry plant, consisting of four 16x20 brooder houses, one 20x50 one-half monitor house, 280 rods poultry fence with necessary steel posts and gates; five-room cottage for poultryman, and two new four-room cottages for farm labor.

A 16x24 incubator room, with feed room above, is now being constructed, and plans are being considered for building a a 20x100 one-half monitor poultry house for housing the 500 White Leghorn commercial unit.

PIEDMONT STATION, *Statesville.*—The work of this station deals with agricultural problems of the Piedmont section, and experiments are conducted with a view of gathering knowledge relative to better methods of farming for that area. The tests carried on during the year include:

A series of fertilizer and rotation experiments with corn, cotton, oats, rye and wheat; seed improvement and selection work, principally with cotton, corn and wheat; variety studies with apples, peaches, pears, pecans, cherries and plums; feeding tests with swine and sheep.

A series of pastures has been arranged that will provide grazing practically the year round for hogs and sheep, besides growing, in rotation with pasture crops, sufficient silage corn for feeding tests with beef cattle during the winter.

The swine tests show the following results:

The average cost of raising pigs to the weaning age is $3.97.

The cost per pig is greater in small litters.

The number of pigs in the litter has little effect upon the size of each pig at weaning time.

More pigs are raised in fall litters.

Larger pigs are raised in spring litters, and cost less per pound.

Sows that increase in weight during the suckling period wean heavier pigs than those that decrease in weight.

Feeding tests with the farm work stock show that cotton seed meal is relished more by horses than by mules, and that no bad effects were noticeable when as much as one and one-half pounds of cotton seed meal were fed daily to a work animal. When cotton seed meal is fed, the grain ration is cheapened slightly.

The seed selection and improvement work with King Cotton has given splendid results, and as a result this station is growing the improved strains as a general farm crop, and distributing the seed to farmers at a reasonable cost.

Improvements during the year:

One mile of new fence for pastures and feeding lots; repairing and painting roofs on the two main barns and implement shed.

TOBACCO STATION, *Oxford.*—This station has many visitors seeking information on tobacco culture, and several meetings were held during the year for the purpose of studying the work of the station. The results of the fertilizer and rotation experiments have a great deal of influence on the kinds and amounts of fertilizer used by the tobacco growers, particularly in the old belt.

The experiment work here has been continued during the year in co-operation with the United States Department of Agriculture. The outstanding tobacco experiments under way are fertilizer tests, variety tests, rotation systems for tobacco, tobacco after cowpeas, permanent tobacco seed beds, potash and lime experiments, and nutrition investigations with continuous cropping, legume effects, and general crop effects.

Considerable progress has been noted from all these tests, but the results of one experiment has been outstanding and will mean a great saving to the tobacco growers. It was found that magnesium in the form of dolomitic limestone applied at the rate of 1,000 pounds per acre

would prevent "sand drown" a common tobacco disease. It was further shown that this disease can be checked in the early stages by a side application of magnesium.

The Experiment Stations have made considerable progress during the year and several items of permanent improvement have been added, which will aid in handling the investigations on a better basis. These stations are the field laboratories of the agricultural workers in the State who are continually working to find new facts that will apply to better methods of farming. The work on the stations is enlarging each year to meet with the demands for information on various farm problems, and it is very important that adequate equipment is provided to handle these investigations in a creditable manner.

The foregoing covers in a brief way the work of investigation of the Experiment Station. Another report in rather greater detail to be published elsewhere, covers the work of the Agricultural Extension Service and it is not thought necessary to repeat that here. The work of the Experiment Station and the Extension Service is under the control of the Joint Committee for Agricultural Work, composed of the Governor, as Chairman, the President and four members of the Board of Trustees of the State College, and the Commissioner and four members of the Board of Agriculture, thus making it cooperative between the State College of Agriculture and the State Department of Agriculture, and it has the cooperation of the Federal Department of Agriculture in all experimental and extension work conducted by that Department in the State.

B. W. KILGORE, *Director.*

# MUSEUM

The year 1921 was one of uncertainty, with the possibility of having to put the Museum out of commission at any time always hanging over us. Another complicating feature of the year's work—over which we had no control—was the necessity for cutting expenses to the limit. This we did in the operation of the Museum, and I feel that this Division did its full share in keeping down expenses to the lowest possi- point. But, as we had not increased expenses much during the period of expansion, it naturally follows that we could not make as severe cuts as were possible in some of the other Divisions.

Under these conditions it was out of the question to originate any new lines of work, but the correspondence and the routine work of the division were carried out satisfactorily. As usual, all inquiries coming to the department that are not directly referable to other divisions are assigned to the curator for handling. Many inquiries relating to game birds and animals, to fish and game laws, to trapping for fur, to stocking fish ponds, to rid premises of rats and mice, to prepare specimens for school museums, to tan hides on the farm, etc., have been handled. Quite a number of such requests for information come from personal callers at the office; others through the mail, and all have been given the best of attention.

Mr. Harry T. Davis, the Assistant Curator, has handled all questions relating to Geology and Mineralogy that have come to the Department. During the sixteen months of his service with the Department, up to November 15, 1921, he examined 335 specimens of rocks and minerals from 228 different inquirers, covering 62 counties of this State and one each from Virginia, Georgia and Texas.

This is at the rate of a little over twenty a month, which would seem to indicate that people all over the State depend on the department for the indentification of such mineral specimens as they desire to have examined.

This work in all cases calls for the identification of the specimen and in many cases for a partial or complete chemical analysis. We partially equipped a small laboratory for this work when Mr. Davis first came, and it would now be wise to add to this equipment.

Mr. Davis also rearranged and classified a large part of the mineral collections of the Museum, though there is still a lot of work ahead in this line.

In connection with the equipping of the new building the necessity for a new entrance to the Museum should not be overlooked. The only entrance worthy of the name was eliminated in the demolition of the old Agricultural Building and it would be but little short of criminal

to attempt to handle our State Fair Week crowds on the narrow and and crooked stairway on the Halifax Street side that is now the only means of communication between the two floors. In fact, a new entrance to the Museum, on Halifax Street, has always been regarded as a part of the new building program and as a necessity in connection therewith.

The parts of the Agricultural Building left intact have been standing for from twenty to twenty-six years, and in that time no painting of the woodwork and no general repair work has been put on them. With the new structure built on it would seem imperative to give these annexes to the old building a thorough overhauling and renovation in connection with the new structure which they now adjoin. Such is badly needed, some of the old window sills having virtually rotted away. Steel window frames and sash should be substituted, with fire-proof glass in the windows on the north side.

In the wrecking of the old building the Museum lost 6,285 feet of floor space and it does not get a single foot of space in the new building. So, unless the room originally dismantled for the Red Cross, together with the space that has been diverted to offices on the Salisbury Street side, are diverted back to the Museum, we will have to make our rearrangements after the completion of the building program on a plan about one-third smaller than that we have been using. And I believe the Museum to be too important an institution to the State at large to have its activities restricted to this extent. I am reporting these conditions, so that the Board may be fully advised as how the new building program affects the Museum.

During the year now closing most of the efforts of the Museum force have been directed to matters relating to the Department's new building and to our exhibit at the State Fair.

As preliminary floor plans of the new home of the Department were submitted by the engineer to the local members of the Building Committee a preliminary assignment of the space was worked out. One whole floor being already assigned to the Legislature for committee rooms, and the equivalent of eight offices going to the State Library Commission, it transpired that very careful work was necessary to properly house all the forces of the Department in a manner satisfactory to those immediately concerned. Changes in the plans necessitated changes in the assignments, but a plan was finally adopted that is perhaps as satisfactory as any that could be made.

The Housing Committee instructed me to prepare a tentative assignment of space in the Museum rooms to all the Divisions that could possibly be cared for therein. This was the most difficult job of the series connected with the vacation of the old building, as there was nothing definite known at that time on the amount of space that would be available. But a plan was finally worked out and submitted to the Housing Committee, by which it was approved virtually as presented.

This plan, however, had to be modified in detail as the moving progressed.

The moving of every case in the Museum, the storage of such cases as could not well be used, or were not needed, as partitions between offices, the moving into the Museum rooms of the forces from the old building, along with their furniture and fixtures, was quite an undertaking, with a lot of clearing up, construction and equipment work following.

The old building was turned over to the Contractor for wrecking on April 10, the date estimated by me when the moving operation started and which was considerably earlier than that expected by either the Engineer or the Contractor. The Contractor started his wrecking operations the day the building was turned over to him.

In the occupancy of the temporary quarters it was found necessary to provide additional supports for parts of the upper floor that were in danger from overloading. This was only done after an inspection by the Engineer and the Contractor.

It will be necessary to provide additional heat for some of the temporary office quarters during the coldest of the winter months. Perhaps the most economical method of doing this will be to employ a fireman to run the heating plant all night during this period. Mr. Horton tells me that he thinks he can get a man to do this night work for about eighteen dollars a week, and he believes that the results would be satisfactory. Action by the Board is desired.

Details of matters relating to the equipment of the new building and to the re-opening of the Museum were presented in my report of May 27, 1922. These are under consideration by the Building Committee and will no doubt be presented to the Board by Chairman R. W. Scott. And I am presuming that all other matters pertaining to the new building will also be presented by the Building Committee.

## STATE FAIR

The Department's exhibit at the State Fair was placed in the hands of a committee consisting of the Curator, the Secretary and the Botanist. The writer was given a pretty free hand by the committee and, with the able assistance of Mr. Davis, we installed what was perhaps the best and most attractive exhibit the Department has ever made at the Fair.

Of course, no satisfactory exhibit could have been made without the active cooperation of the divisions participating. The following were represented: Animal Industry and the Branch Experiment Stations, each with an elaborate exhibit occupying from 500 to 700 square feet of space; Entomology, specializing on the boll weevil and the Mexican Bean Beetle; Farm Engineering; Plant Pathology; Food Inspection; Horticulture; Markets; Botany, and Publications. All were good and, in the main, well demonstrated by the individual Divisions.

The central piece of the exhibit, which attracted much favorable notice, was designed and painted by the Curator and his assistant, Mr. Burgess being responsible for the landscaped foreground. This centerpiece showed the sun rising above a range of mountains, the body of the sun being a replica of the Department's seal and the rays indicating in subdued lettering every line of work in which the Department is engaged. The mountain range at the back ran down to a small lake in the foreground which was fed by two mountain streams. The overflow from the lake turned the wheel of a small grist mill. The lake was stocked with fish.

Ten thousand folders describing the various lines of the Department's work were printed, and distributed from the exhibit, and I believe that the annual exhibit of the Department at the State Fair is one of the best efforts we make toward the popularizing and spreading of information on the varied work of the Department.

As I have stated before in my reports, I still believe that the State Fair should be under State control.

## MUSEUM

The Building Committee is expected to include among its recommendations to the Legislature a request for funds to put the Museum in condition again following the occupancy of the new building by the forces of the Department now using the exhibition rooms for offices and laboratories. If this request to the Legislature should prove unsuccessful I hardly see how we are going to function properly in the future unless the Board is able to appropriate rather ample funds for our rehabilitation.

## MOVING

An appropriation for moving the Department's force into the new building and rearranging the contents of the Museum should be provided.

## CUSTODIAN

The office of Custodian of the new building should be created and the duties and compensation of such officer prescribed. I shall endeavor to draft a schedule of such duties before the meeting of the Board, for scrutiny.

Respectfully submitted,

H. H. BRIMLEY, *Curator.*

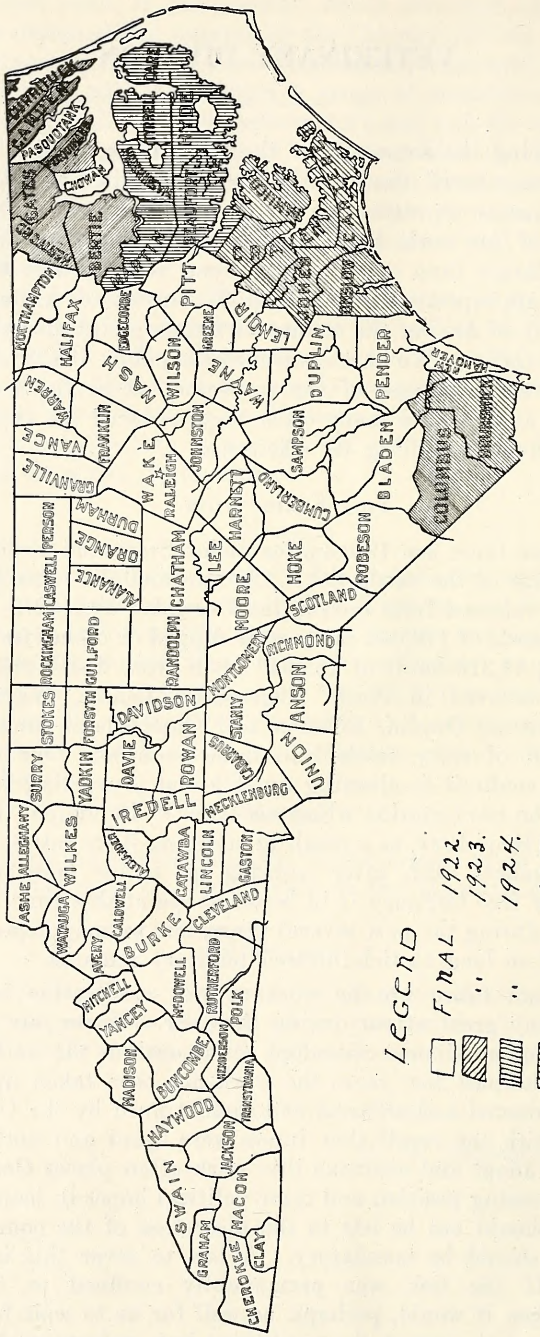
# VETERINARY DIVISION

In considering the summary of the work done by this Division, it should be remembered that, while our appropriations are not large, they by no means represent the amount of work accomplished. The greater part of our work is co-operative and a sum from other sources, many times larger than our appropriations, is applied to the work. I refer to the appropriations of the U. S. Bureau of Animal Industry and our policy of having the county or municipality directly benefited, share in the expense. We have continued the policy of having the owner bear the traveling expense of the inspector, where the service was a personal one and have in many other ways reduced the expense of this Division without curtailing its efficiency.

## Tick Eradication

At this time there are 19 counties under State and Federal quarantine on account of the cattle tick. Chowan and the remainder of Pitt County were released from quarantine December 10, 1921. During the year 37,339 herds of 179,044 cattle were dipped or otherwise disinfected. During 1921, 44,313 herds of 168,649 cattle were disinfected. Reinfestation has occurred in Nash, Edgecombe, Lenoir, Wayne, Pender, Bladen, Sampson, Duplin, Robeson and Cumberland counties, due to the movement of ticky cattle into these counties. Our efforts have largely been confined to cleaning up this and preventing further reinfestation. The reinfestation which occurred in Randolph, Guilford and Alamance in May, 1921, as a result of shipping ticky cattle, was cleaned up in September, 1922, after working on it for more than fifteen months. Our free territory is in better shape at this time than at any other period during the past several years, but we may expect reinfestation to occur so long as tick-infested territory remains.

We have not taken up the work of tick eradication in the ticky counties to any great extent during the year. Under our present law the County Commissioners can adopt or discontinue the work when they see fit. In the past few years the work has been taken up in several counties, conducted a short time and discontinued by the County Commissioners, with the result that funds were spent and nothing accomplished. To adopt and continue this work often places Commissioners in an embarrassing position and their political hopes in jeopardy. Tick eradication should not be left to the discretion of the county commissioners, but should be mandatory. A law to cover this is an urgent necessity. If the tick was permanently confined to the quarantined area, then it would, perhaps, be well for us to wait for time and other influences to correct the condition; but, unfortunately, this pest


CURRITUCK
DARE
HYDE
TYRRELL
WASHINGTON
TERRITORY
PASQUOTANK
PERQUIMANS
CHOWAN
GATES
BERTIE
MARTIN
PITT
GREENE
LENOIR
CRAVEN
JONES
CARTERET
NORTHAMPTON
HALIFAX
EDGECOMBE
WILSON
WAYNE
DUPLIN
PENDER
NEW HANOVER
BRUNSWICK
WARREN
NASH
JOHNSTON
SAMPSON
BLADEN
COLUMBUS
VANCE
FRANKLIN
WAKE
GRANVILLE
DURHAM
CHATHAM
LEE
HARNETT
CUMBERLAND
ROBESON
ORANGE
ALAMANCE
CASWELL
PERSON
MOORE
HOKE
SCOTLAND
RANDOLPH
MONTGOMERY
RICHMOND
STOKES
ROCKINGHAM
GUILFORD
DAVIDSON
ANSON
SURRY
FORSYTH
DAVIE
ROWAN
STANLY
UNION
YADKIN
IREDELL
MECKLENBURG
ALLEGHANY
WILKES
CATAWBA
LINCOLN
GASTON
ASHE
WATAUGA
CALDWELL
CLEVELAND
AVERY
BURKE
MITCHELL
MCDOWELL
RUTHERFORD
POLK
YANCEY
MADISON
BUNCOMBE
HENDERSON
TRANSYLVANIA
HAYWOOD
SWAIN
JACKSON
GRAHAM
MACON
CHEROKEE
CLAY
LEGEND
FINAL 1922.
" 1923.
" 1924.
" 1925.

cannot be entirely restricted, and we may expect at any time to find that it has spread to other sections of the State.

The States of Virginia and Tennessee have recently adopted regulations which prohibit the movement of cattle from the quarantine area into those States. This has the effect of cutting off all except local markets, and presents a problem which must be met. Some plan that will permit the marketing of cattle from the quarantine counties, without danger of spreading ticks to free territory, must be adopted.

## TUBERCULOSIS ERADICATION

Tuberculosis eradication has gone forward during the year at a rapid rate, due to the hearty cooperation we have received.

The demands for tuberculin tests have exceeded anything that we might have expected when the work was started in 1918. A summary of the tests applied for the past several years will bear this out:

| | | | | | |
|---|---|---|---|---|---|
| 1918 | 4,358 | cattle | 104 | reactors, | 2.4 % |
| 1919 | 7,445 | cattle | 168 | reactors, | 2.2 % |
| 1920 | 10,389 | cattle | 219 | reactors, | 2.1 % |
| 1921 | 23,402 | cattle | 385 | reactors, | 1.6 % |
| 1922 | 101,271 | cattle | 792 | reactors, | 0.78 % |

While the number of reactors has increased, the percentage has greatly decreased.

Prior to September, 1921, this work consisted of promiscuous testing throughout the State, during which time we demonstrated the importance of tuberculosis eradication and laid the foundation for taking up area work. Area work (that is, the testing of all cattle in a county) has been taken up in the counties of New Hanover, Cumberland, Robeson, Wayne, Alamance, Guilford, Forsyth, Stokes, Davidson, Rowan, Iredell, Cabarrus, Mecklenburg, Buncombe, Scotland, Pender and Davie. Two tests have been completed in New Hanover and one in Forsyth, Pender, Scotland, Davie, Buncombe, Rowan, Cumberland and Davidson. The first test will be completed in several others in the near future.

We plan to take up this work in other counties as rapidly as possible, and we are confident that the amount of infection found will be small. This work is conducted in co-operation with the U. S. Bureau of Animal Industry and the County Commissioners, the county sustaining a large part of the expense. In this way much more can be accomplished than through direct appropriations from the Department. In addition to the area work done, we test all herds owned by the State and charitable institutions, herds supplying milk to the principal towns and cities of the State, and as many demonstrational tests as is possible with our force of inspectors.

We have been unable to have our appropriation of $5,000 for the payment of indemnities for animals slaughtered on account of being affected with tuberculosis, increased by the Legislature. We have on

hand at this time 200 claims, amounting to about $6,000, which we are unable to pay, our appropriation having been exhausted several months ago. We are holding the same number of claims for Federal indemnity for a like amount. Federal indemnities cannot be paid unless the State pays. This matter will be referred to the Legislature when it meets in January.

## HOG CHOLERA

Hog cholera control has been conducted as usual, in cooperation with the U. S. Bureau of Animal Industry. In previous years this disease has been confined chiefly to the free range section in the eastern part of the State. During this year, in that section, the disease has greatly decreased over former years, due to the adoption of stock law and the more intelligent use of serum as a preventive. Each succeeding year will, no doubt, show a decline in this disease.

A few sporadic outbreaks of cholera have occurred in other sections of the State, due chiefly to the buying of hogs. In the future, special attention will be given to hogs that are shipped into the State, with a view of preventing diseased animals being distributed.

## SERUM PLANT

I have previously reported that I thought it was not wise to continue to produce anti-hog cholera serum. We are not located so as to secure proper hogs for this purpose when needed, and the expense incident to serum production is large. The production of commercial serum is on a firm basis under Federal supervision. We are able to purchase a reliable product in quantities and distribute it to swine owners at a very reasonable price.

The Animal Industry Division is now conducting experiments with hogs at the plant. The equipment has been left intact, and we can, at any time, again take up the production of serum if it becomes necessary or advisable.

From November 1, 1920, to November 1, 1921, we distributed 2,878,995 c.c. serum and 99,683 c.c. virus, and from November 1, 1921, to November 1, 1922, 1,710,915 c.c. serum and 65,885 c.c. virus. This was shipped to all sections of the State, the most of it going to the eastern section. The price of serum and virus at this time is $1.10 per 100 c.c., which takes care of the cost of serum, packing, storing and other overhead.

The serum receipts for the twelve months ending November 1, 1921, were $40,328.82 and for the twelve months ending November 1, 1922, $22,883.19.

## INVESTIGATIONS

About the usual number of investigations have been made during the year. We have tried, as far as possible, to avoid useless trips.

FORAGE POISONING.--This disease has occurred to some extent, and we have investigated some cases and given information as to its cause and prevention. This information has also been given in numerous instances by letter.

BLACK-LEG.—We have not found any cases of black-leg during the past two years. In those sections where it was formerly prevalent, vaccine is regularly used. We have distributed a large quantity of black-leg vaccine. This is furnished by the U. S. Department of Agriculture. They discontinued producing vaccine on July 1, 1922, and when we have used up the supply we have on hand it will be necessary for us to purchase this and distribute it at cost.

ANTHRAX.—There has been no anthrax found or reported during the past two years.

HEMORRHAGIC SEPTICEMIA.—This disease, some years ago, was quite prevalent among cattle. It has not occurred to any extent during the past two years.

GLANDERS.—We have tested a number of horses and mules for glanders, but only two cases have been found or reported. These two animals were promptly destroyed and the premises disinfected. The owners were paid an indemnity under the State law.

CONTAGIOUS ABORTION.—This disease exists to a considerable extent in many sections of the State and seems to be on the increase. We are giving all the information possible on this, by mail and by personal investigations, though the latter is limited on account of a lack of funds.

WM. MOORE, *State Veterinarian.*

# ANIMAL INDUSTRY DIVISION

The following report sets forth the fundamental lines of work which have been conducted by the Experiment Station and Extension workers during the past fiscal year. It is not necessary to state that it would be impossible to go into the details of this work, because of the magnitude and variety of subjects on which work has been done. The work of the Animal Industry Division is not only going along well, but the scope and influence of the work are constantly broadening, as shown by the extraordinary number of calls for information along Experiment Station lines, and calls for help from the Extension workers.

The following subjects covered represent lines of work, most of which are of State-wide importance and many of which are of South-wide importance. The latter is particularly true of the work being done in the Experiment Station and represented by such problems as soft pork, mineral requirements of growing animals, effect of cottonseed meal on the health and reproduction of breeding animals, and the digestive coefficiency of feeds in fowls.

The Extension work is rapidly being transformed from the old practice of giving service to purely instructional work. This not only enables these workers to conduct a larger volume of work, but to do it on a much more effective basis.

The recommendations and matters for special consideration follow at the close of the report. If members of the Board wish, for any reason, additional information on the work being conducted, or to go further into the matter of the use to be made of appropriations requested, such will be furnished gladly upon request.

## Animal Nutrition

J. O. Halverson, *In Charge*

*Assistants:* F. W. Sherwood and B. Naiman

### I. Soft Pork Studies

The following feeding projects in cooperation with Mr. Hostetler have been successfully completed; analytical work on Soft Pork Experiment V is being completed and data worked up on all experiments, with which will be incorporated a review of the soft pork investigations.

*Completed to Date.*

1. (a) Lot feeding to 108-lb. pigs on peanuts; (b) on peanut meal; both for 131 days.
2. Individual feeding to 150-lb. pigs for 70 days.
3. Individual feeding to 120-lb. pigs for 77 days.
4. Individual feeding to 67-lb. pigs for 110 days.
5. Individual feeding to 103-lb. pigs for 74 days, with hardening feeds.

*Projected Work.*

The complex effect of food on the body carcass of the hog is pronounced. Three distinct lines of attack are contemplated, given briefly on separate report.

II. THE NUTRITIVE VALUE OF THE PEANUT

These studies are nearing completion; the following are completed:

(a) The raw peanut without hulls, but with sheath.

(b) The roasted peanut without hulls, but with sheath.

(c) Peanut meal without hulls.

(d) The study of the nutritive value of peanut meal in the form of baked bread, without the addition of wheat flour, will take considerable more work. The unexpected results obtained tend to give further insight into the feeding value of the heated peanut meal, and its deficiencies.

(e) Studies are now under way supplying the deficiencies of the peanut kernel by means of the peanut leaf itself, soy bean leaf and alfalfa leaf in varying amounts.

III. MINERAL SUPPLEMENTS, CHIEFLY CALCIUM, FOR SOUTHERN ANIMALS

One phase of this problem of practical importance in limestone-free regions is the calcium content of commercial mixed feeds. Two years' work, including the analysis of 120 mixed feeds containing six or more feed ingredients exclusive of salt, has been done in cooperation with the feed laboratory. This work is completed, ready for publication, under the title of "The Calcium Content of Mixed Feeds in Relation to the Feeding Requirements of Animals," by J. O. Halverson and L. M. Nixon.

IV. THE NUTRITIVE QUALITY OF BUTTER FROM COWS FED EXCLUSIVELY ON DRY FEED, COTTONSEED MEAL AND HULLS. (COMBS AND CURTIS PROJECT)

By feeding the butter from such dry-fed cows to growing albino rats, an attempt is made to ascertain whether fat Soluble A is present in the normal amount. Six series of such feeding experiments are nearing completion. This work is being done on the butter fat on hand. Certain definite results have been obtained, but more butter-fat is needed to eliminate the influence of the length of storage upon the fat-soluble A content.

V. PUBLICATIONS—YEAR 1922

(a) Extension Pamphlet, The Optimum Diet with the Relative Importance in the Diet of Fruits, Vegetables and Milk.

(b) The Need of Milk in the Diet.—Sunday edition News and Observer.

(c) The Calcium Content of Mixed Feeds in Relation to the Feeding Requirements of Animals, by J. O. Halverson and L. M. Nixon.

N. C. Academy of Science, May 10, 1922, University of North Carolina.

Southeastern Meeting Feed, Food and Drug Officials, Asheville, August 24, 1922.

*Other Activities.*

(a) A series of lectures and demonstrations was given on The Effects of Various Diets, before the Annual Conference of Home Demonstration Agents.

(b) Cooperated with the Home Demonstration Division at the State Fair.

(c) Cooperated with the Extension Division of Dairying in the Charlotte Milk Campaign and Statesville Livestock Show with exhibits.

## OFFICE OF SWINE INVESTIGATIONS

EARL H. HOSTETLER, *In Charge*

The following special experiments were carried on during the past year:

### I. FISH MEAL FOR SWINE

Object: To determine if pigs of different weights will consume enough fish meal in the ration to transmit a fishy flavor in the meat.

Plan: (a) To allow two pigs of different weights to have fish meal and shelled corn from a self-feeder.

(b) To feed one pig 10 per cent of fish meal in the ration.

Record:

TABLE 1. *Fish Meal for Swine*

| PIG NO. | INITIAL WEIGHT | FINAL WEIGHT | DAYS ON FEED | FEED CONSUMED | |
|---|---|---|---|---|---|
| | | | | SH. CORN | FISH MEAL |
| 34 | 126 | 280 | 114 | 888 | 19 |
| 36 | 63 | 95 | 43 | 230 | 15 |
| 18 | 128 | 321 | 118 | 743 | 82 |

Pigs No. 34 and No. 36 were fed the shelled corn and fish meal in separate compartments of a self-feeder, while Pig No. 18 was fed a mixture containing nine parts cracked corn and one part of fish meal. It is interesting to note the variation in the amount of fish meal consumed by Pigs No. 34 and No. 18, since they were of practically the same initial weight and on feed practically the same number of days.

No "fishy" taste was detected in any of the meat from these three pigs, which would seem to indicate that the danger of tainting pork from feeding fish meal to swine is negligible.

Results: No "fishy flavor" was detected.

### II. SOFT PORK STUDIES IN COOPERATION WITH J. O. HALVERSON

A. *Individual Work.*

Object: To determine the effects of feeding various amounts of oil (peanuts) on the carcass of pigs of various weights; keeping the energy and protein equal in each case.

Plan: (a) To make up rations containing approximately 8, 12, 16 and 20 per cent oil, then, in addition to these four rations, have one ration containing peanuts alone and another ration, which shall be used as a check, containing 60 per cent corn meal, 30 per cent shorts, 5 per cent tankage and 5 per cent linseed meal.

(b) This work as planned will necessitate only one pig on each ration.

Record:

TABLE 2. *Soft Pork Investigations with Individual Pigs*

| NUMBER EXPERIMENT | NUMBER USED | AVERAGE FINAL WEIGHT | AVERAGE DAILY GAIN | FEED PER 100 LB. GAIN | COST PER 100 LB. GAIN |
|---|---|---|---|---|---|
| 2 | 5 | 260 | 1.56 | 335.0 | $14.21 |
| 3 | 6 | 227 | 1.41 | 327.0 | 12.50 |
| 4 | 7 | 218 | 1.43 | 286.1 | 11.23 |
| 5 | 5 | 224 | 1.69 | 332.0 | 8.79 |

Results: The results so far seem to indicate that oil is the cheap factor in making soft pork, although enough work has not been done to make it conclusive.

B. *Lot Work.*

Object: To determine if the size of the pig, when he is put in the finishing lot, after being fed on so-called softening feeds, is a factor in determining the firmness of the carcass after a 60-day finishing period on shelled corn and tankage self-feed.

Plan: To feed 30 pigs, as soon as weaned, on peanuts alone for at least eight weeks. Thereafter to divide these 30 pigs into three lots of ten pigs each, using pigs in Lot 1, weighing approximately 90 pounds; in Lot 2, weighing over 100 pounds, and in Lot 3, weighing less than 80 pounds.

Record: Experiment in progress.

Results: Incomplete.

III. SOFT PORK STUDIES IN COÖPERATION WITH BUREAU OF ANIMAL INDUSTRY

Object: (a) To determine the effects of feeding peanuts from a self-feeder in a dry lot, and the effects of grazing soy beans with a 2½ per cent ration of shelled corn, upon the carcass.

(b) To determine the effects on the carcass of pigs by finishing them in a dry lot for 12 weeks on corn and fish meal, self-fed, after 8 weeks on softening feeds.

Plan: To use 12 pigs on peanuts and 12 on soy beans, making shipments of three pigs to the Bureau of Animal Industry at intervals of four weeks each, beginning with the close of the grazing period.

Record: Experiment in progress.

Results: Incomplete.

IV. EXHIBIT OF PURE BRED DUROC JERSEY SWINE AT 1922 N. C. STATE FAIR

Object: To determine the merit of our hogs as compared with others in the show ring.

Plan: To use such animals in the herd as are available for this purpose.

Record: Fifteen hogs were entered in the show and competed in a creditable manner.

Results: The winnings amounted to $91.00.

## EDGECOMBE TEST FARM

The herd of grade Berkshires that has been kept at this farm is being disposed of as rapidly as possible.

In May, 1922, nine pure bred Hampshire gilts and a Hampshire boar were purchased for this farm, and will be maintained to produce pigs for experimental work and to use for demonstration purposes.

The special experiments completed at this farm during the past year are as follows:

I. COST OF RAISING PIGS TO WEANING AGE

Object: To determine the cost of producing pigs to the age of ten weeks.

Plan: To use the farm herd for this purpose.

Record: Reported in Experiment Station Bulletin No. 244.

Results: Each pig cost $4.07.

II. PEANUTS FOR SWINE

Object: (*a*) To determine the amount of pork produced by a given area of peanuts.

(b) To determine the condition of the carcasses after pigs have been grazed on peanuts for 8 weeks.

(c) To determine the effects of an 8 weeks' finishing period on corn and tankage after pigs have been grazed for 8 weeks on peanuts.

Record:

TABLE 3. *Peanuts for Fattening Swine*

A. GRAZING PERIOD

Period: September 27 to November 22, 1921—56 days.

| NUMBER IN LOT | RATION | AVERAGE FINAL WEIGHT | AVERAGE DAILY GAIN | FEED PER 100 LB. GAIN | COST PER 100 LB. GAIN |
|---|---|---|---|---|---|
| | | | | PEANUTS | |
| 18 | Peanuts | 151.9 | .87 | .76 A. | $11.40 |

B. FINISHING PERIOD

Period: November 22, 1921, to January 17, 1922—56 days

| NUMBER IN LOT | RATION | AVERAGE FINAL WEIGHT | AVERAGE DAILY GAIN | FEED PER 100 LB. GAIN | | COST PER 100 LB. GAIN |
|---|---|---|---|---|---|---|
| | | | | SH. CORN | TANKAGE | |
| 9 | Shelled Corn and Tankage | 238.4 | 1.95 | 370.8 | 30.9 | 7.70 |

Prices used:

Shelled corn, $1.00 per bushel.

Tankage, $70.00 per ton.

Peanuts, $15.00 per acre.

Results:

1. One acre of peanuts produced 151½ pounds pork.
2. None of the pigs were strictly "hard" after an 8 weeks' finishing period on corn and tankage.

NOTE—For some unaccountable reason, the gains made on peanuts during this experiment were extremely low.

### III. RECORD OF FARM WORK ANIMALS

This experiment was closed December 31, 1921, and a complete record of the work done is shown in September, 1922, Bulletin of the Department of Agriculture.

## BLACK LAND BRANCH STATION

The swine work at this farm was begun in January, 1922, by the purchase of a carload of pigs in South Georgia. Six of these pigs were retained on the farm at the close of the following experiment, for use as brood sows.

The special experiment carried out is as follows:

### I. MARKETING CORN IN EASTERN NORTH CAROLINA THROUGH HOGS

Object: (a) To determine if the corn grown on the farm could be marketed through hogs more profitably than to be sold as grain.

(b) To compare tankage and fish meal as supplements to corn for fattening swine.

Plan: (a) To purchase one carload of pigs in South Georgia and feed them out on corn raised on the farm, for a sufficient length of time to make two carloads of hogs for market.

(b) To divide the pigs obtained into two equal lots, feeding Lot 1 on shelled corn and fish meal, and Lot 2 on shelled corn and tankage, using three self-feeders in each lot.

Record:

TABLE 4. *Tankage vs. Fish Meal*

Period: February 1 to April 12, 1922—70 Days

| LOT NUMBER | NUMBER IN LOT | RATION | AVERAGE FINAL WEIGHT | AVERAGE DAILY GAIN | FEED PER 100 LB. GAIN | | | COST PER 100 LB. GAIN |
|---|---|---|---|---|---|---|---|---|
| | | | | | SHELL CORN | FISH MEAL | TANKAGE | |
| 1 | 68 | Corn and Fish Meal | 151.5 | 1.16 | 330.3 | 43.5 | ---------- | $5.14 |
| 2 | 67 | Corn and Tankage | 146.9 | .96 | 364.5 | ---------- | 49.8 | $5.83 |

NOTE—On March 16, 40 hogs out of Lot 1 and 29 hogs out of Lot 2 were sold.

Results: (a) The corn was marketed through the hogs for $1.10 per bushel, instead of 65 cents, the prevailing price when the experiment was begun.

(b) Fish meal was more valuable as a supplementary feed to corn than tankage.

## IREDELL TEST FARM

A pure bred herd of Poland China hogs is kept at this farm for experimental and demonstrational purposes.

Special experiments conducted during the past year are as follows:

### I. COST OF RAISING PIGS TO WEANING TIME

Object: To determine cost to produce pigs to weaning age—70 days.

Plan: To use all sows and litters for this purpose.

Record: Reported in Experiment Station Bulletin No. 244.

Results: Each pig cost $3.97.

### II. VALUE OF SOY BEAN PASTURE FOR SWINE

Object: To determine value of allowing pigs to graze soy beans, beginning the test about the time the beans are in the "dough stage."

Plan: To use 16 spring pigs and allow them a 2 per cent ration of shelled corn 9/10 and tankage 1/10, in addition to the soy beans.

Record:

TABLE 5. *Soy Bean Pasture for Swine*

Period: August 31-October 13, 1922

| NUMBER IN LOT | RATION | AVERAGE FINAL WEIGHT | AVERAGE DAILY GAIN | FEED PER 100 LB. GAIN | | COST PER 100 LB. GAIN |
|---|---|---|---|---|---|---|
| | | | | GRAIN | PASTURE | |
| 16 | Soy Bean Pasture with Grain | 111.6 | .59 | 295.0 | .547 A. | $11.24 |

Results: Pigs made only .59 pound average daily gain.

NOTE—The area used was seeded to soy beans, but because of a late frost, one-half acre was replanted to cowpeas. The cowpeas were beginning to dry up when the pigs were turned into the field.

### III. FEEDING OF FARM WORK ANIMALS

This work is being carried on at the present time in the same way as in former years, but new work will be undertaken as soon as a definite plan can be decided upon. The results of the past seven years are shown in the September, 1922, Department of Agriculture Bulletin.

UNITED STATES DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

I. SOFT PORK WORK:

The eight States that are coöperating in soft pork work this year ship all hogs to the Bureau of Animal Industry farm at Beltsville, Md., to be slaughtered. After these hogs are slaughtered, the carcasses are held in the cooler at an approximate temperature of 36 degrees Fahrenheit for forty-eight hours. At the close of the cooling period a representative committee makes a physical examination of these carcasses to determine their condition.

This committee is composed of the following men:

Earl H. Hostetler, Raleigh, N. C., representing the Experiment Stations.

Howard Smith, Baltimore, Md., representing the packers.

Dr. Walters, Washington, D. C., representing the Federal Department.

In addition to the physical grading made by the above committee, a chemical examination is made on one sample of back fat and one sample of leaf fat from each carcass.

In the work that has been done up to the present time approximately 1000 hogs have been used, and, in addition to the eight States that are cooperating this year, the Bureau of Animal Industry is including tests made at Beltsville, Md., and at McNeill, Miss.

## OFFICE OF DAIRY EXPERIMENTATION

STANLEY COMBS, *In Charge*

### CENTRAL EXPERIMENTAL FARM

I. OBJECT: TO DETERMINE THE EFFECT OF COTTONSEED MEAL ON COWS AND HEIFERS IN REPRODUCTION

(Cooperative, Combs and Curtis)

This herd consists of sixteen grade Ayrshire cows in the milking herd, with six yearling heifers and a herd bull. Two of these cows have been in

the herd since 1915. The other fourteen were purchased from the Pinehurst Dairy as calves and during January, 1920, as yearlings. They were divided into lots and fed as follows:

| LOT NO. | GRAIN RATION | ROUGHAGE |
|---|---|---|
| I. | Cottonseed meal ..... 1 part | Cottonseed hulls ..... ad libitum |
| II. | Cracked corn ..... | Corn stover ..... 1 part<br>Corn silage ..... 2 parts } ad libitum |
| III. | Cottonseed meal ..... 1 part<br>Crushed corn ..... 1 part | Cottonseed hulls ..... 1 part<br>Corn silage ..... 2 parts<br>Corn stover 1 part } ad libitum |
| IV. | Cottonseed meal ..... | Corn silage ..... ad libitum |
| V. | Cracked corn ..... 3 parts<br>Wheat bran ..... 1 part<br>Linseed meal ..... 1 part | Alfalfa hay ..... 1 part<br>Corn silage ..... 2 parts } ad libitum |

This young herd was bred to calve the first time during the fall of 1921. On these rations indicated in the first four lots above some of the animals aborted before five months, while others carried their calves the full length of time. However, the calves that were carried full time were weak, small, some blind, and none lived over sixty hours. Those aborted were deformed, blind, and some appeared to have very soft bones and showed œdema in various portions of the animal body.

The following is a brief discussion of the work of these cows as individuals:

Cow No. 102 aborted October 1921. She is being continued on the same to cottonseed meal 90 pounds, calcium carbonate ¾ pound, butter fat 2 pounds, casein 10 pounds, early in the year. She was bred April 3, 1922. Has gained in flesh and seems to be safe with calf.

Cow No. 103 aborted October 1921. She is being continued on the same ration this year. Was bred March 24, 1922, and is with calf.

Cow No. 104 failed to breed in 1921. Her ration was changed to 100 pounds cottonseed meal and ¾ pound calcium carbonate. She was bred January 19. Failed to conceive, and died during the summer. Her ovaries were diseased.

Cow No. 106 produced a calf that lived 36 hours, during 1921. Her 1922 ration consists of cottonseed meal 90 pounds, casein 10 pounds, calcium carbonate ¾ pound. She was bred January 21, 1922, and still carries her calf. The cow is blind.

Cow No. 107 aborted July, 1921. Early in November, 1921, she developed cataracts in both eyes. She is now totally blind. Her ration for 1922 is cottonseed meal 100 pounds, butter fat 2 pounds, calcium carbonate ¾ pound. She was bred April 23, 1922, and appears to be with calf.

Cow No. 105 calved normally in check lot during 1921. She was transferred to Lot 1 early in the year. In about two months she became weak and sluggish, finally developing a severe fit or spasm. After suffering from this for four or five hours we were able to help her up and move her to a shed and shade. She appeared to be suffering from some kind of poison. However, rats suffer in much the same way when suffering from vitamine starvation. Thinking this might be the trouble, she was given yeast. One pound was given before she regained her appetite. She has received one pound each week since this time. She was bred March 28, and again at a later date. She is probably with calf at present.

The four cows in Lot 2 produced calves last year that were weak and died soon after birth. Several years ago, Wisconsin found a ration made up entirely from the corn plant satisfactory. Therefore, half this lot was changed to their ration, which consists of cracked corn 5 pounds, corn gluten meal 2 pounds, and corn stover 7 pounds. Three of these cows are due to calve during the next few days, while the fourth is due in January, 1923.

Cow No. 402 aborted in 1921. Her ration was changed to cottonseed meal 90 pounds, casein 10 pounds and calcium carbonate ¾ pound. She was bred January 18, 1921, and dropped a living calf weighing 62 pounds on October 30. The calf was very weak, but by careful feeding we have been able to keep it alive so far.

Cow No. 403 aborted during 1921. Was kept on the original ration and bred March 1, 1922. She aborted again July 27, 1922. Her ration was changed to Cottonseed meal, 96 pounds, U-Cop-To Special Steam Bone Mineral Meal, 4 pounds, together with Fleischmann's yeast each week. She will be bred during November, 1922.

Cow No. 303 aborted during 1921. Cow No. 304 dropped a weak calf during 1921, which soon died. Both cows were continued on the same ration for another year. They were bred on April 12 and March 23, respectively, and are both with calf at present.

Lot No. 5 is our check lot, and all animals are in good condition and have never been off feed. They produce normal calves each year. Two have already calved.

The milk produced by these experimental cows during the winter and spring of 1922 was fed to calves with the object of determining its growth producing quality. Nineteen calves were used. Curves have been plotted showing the effect upon the milk produced by these various rations. Calves fed milk produced by the cows in Lot 1 made only about one-half as much gain in weight during the first six months as did the calves that received the milk produced in Lot 5.

The calves fed milk from Lot 5 made the best gains. Lots 3 and 2 came in for second place. Lot 4 came next, while the milk produced by the cows in Lot 1 made the poorest gains.

Data is also available showing the amount of milk produced by each cow in the various lots, and its cost per hundred pounds.

## COASTAL PLAIN STATION FARM

### II. HERD DEVELOPMENT

A herd of fifty-three registered Jerseys is now on this farm. This herd may be divided as follows:

23 cows in milk
10 bred heifers
15 open heifers and calves
1 herd bull
3 young serviceable bulls
1 bull calf

Herd development work has been given first consideration during the last year, the same as in the past. The daughters of Eminent 19th are all in milk and most of them have been tested officially and have won their Register of Merit Certificate. Some have made good records. Pender Eminent Lass E, No. 369040, completed her second re-test in July, with 13,774 pounds of milk and 792.48 pounds of fat, Class AA. This makes her the Grand Champion Fat Producing Cow of North Carolina over all breeds, and entitles her to the American Jersey Cattle Club's Gold Medal. She is the third and best daughter of Eminent 19th to win a gold medal. Thus, when Lass E finished

her record, Eminent 19th became the South's first and only Gold Medal Bull. Only twenty-four such bulls have ever been produced in the United States. His daughters hold the Junior two-year-old Class State Record for production, the Senior three-year-old, and the Junior four-year-old, in addition to the Grand Champion of all breeds. In considering all his Register of Merit daughters that are out of Register of Merit dams, it is found that he has increased their production 35 per cent. This is a remarkable increase, considering the fact that the dams were good producers, as is indicated by their official records. His daughters out of ordinary, or average cows, would show a larger increase than this.

A few of the grand-daughters of Eminent 19th are not in milk. Ten more are safe with calf to a son of Eminent 19th. They are a nice appearing lot of heifers and give promise of maturing into high producing individuals. They are sired by Rumina's King No. 160969. King is a line bred "Eminent" bull. Search is now being made for a suitable junior herd sire to breed to the daughters of King.

Owing to the lack of silage, not much experimental feeding was accomplished during the past year. This work consisted largely of the continuation of the projects which were already started. The cooperative velvet bean meal work conducted with the South Carolina and Alabama Stations was completed. In this experiment it was quite noticeable that the cows preferred the wheat bran with cottonseed meal rather than the wheat bran and velvet bean meal. In fact, under pasture conditions we found it necessary to add crushed corn to the ration in order to get the animals to consume enough of the grain ration to maintain their milk flow. The cows consuming the velvet bean meal lost flesh more than the animals receiving cottonseed meal.

The calf feeding work was discontinued during the year; i.e, no more animals were added to either of the two lots. The animals already started on the work were continued on the ration. They should all finish during the coming year. This work was a comparison of the feeding value of peanut meal with cottonseed meal as a protein carrier for maturing dairy heifers. So far the actual results show very little difference in the feeding value of these two feeds. However, cottonseed meal is much more readily obtained, is usually a few dollars cheaper per ton, and gives less trouble while in storage. The peanut meal seems to cake and finally mould when held in the feed room for some time. These are factors worth considerable consideration. Peanut meal should have a place in livestock feeding. It is a good feed and will add variety to the protein content of the ration.

During the spring and summer the milk produced daily by this herd was summarized for the purpose of determining the effect of weather conditions upon the daily production of milk. Two years and six months records have been reviewed. The weather report has been obtained from the Wilmington weather bureau covering the same period of time. The milk produced during the early spring months shows a variation of five gallons per day, i.e., the days with 75 per cent or more of sunshine show an increased production of this amount over those days with less than 75 per cent of sunshine. The humidity reports have not yet been assembled, but it is planned to do this at a future date.

COMPARISON OF 1921 PRODUCTION WITH 1922 PRODUCTION

| MONTH | 1921 | | | 1922 | | |
|---|---|---|---|---|---|---|
| | COWS IN HERD | MILK | FAT | MILK | FAT | COWS IN HERD |
| October | 28 | 13491.1 | 698.90 | 9934.7 | 527.90 | 22 |
| November | 28 | 13845.1 | 774.48 | 10373.5 | 589.26 | 22 |
| December | 25 | 13722.1 | 736.10 | 11620.7 | 633.72 | 22 |
| January | 25 | 12223.9 | 665.94 | 12216.6 | 648.15 | 22 |
| February | 26 | 10385.0 | 518.90 | 12468.0 | 654.81 | 23 |
| March | 26 | 14027.2 | 707.65 | 16266.5 | 844.46 | 23 |
| April | 26 | 13193.5 | 682.40 | 14003.8 | 713.52 | 23 |
| May | 25 | 14602.6 | 749.20 | 10674.4 | 546.99 | 22 |
| June | 25 | 12906.3 | 619.72 | 9610.3 | 496.86 | 22 |
| July | 24 | 12104.4 | 613.12 | 11053.6 | 560.52 | 22 |
| August | 24 | 12126.7 | 598.88 | 11188.7 | 562.36 | 22 |
| September | 24 | 9659.2 | 488.07 | 9716.7 | 500.22 | 23 |
| Total | 25½ | 152,287.1 | 7823.36 | 139125.5 | 7278.77 | 23 1-3 |
| Total values | | $ 7,081.35 | | $ 6469.41 | | |
| Average production per Cow | | 5972.0 | 306.5 | 6229.5 | 325.9 | |

Four years ago only two cows in the herd had ever produced as much as 300 pounds of fat in one year and they each produced this amount once only. The average for the past two years has been above 300 pounds.

The operating expenses have all been taken care of during the past two years by the cash receipts. The increase in the value of the herd and manure have been sources of profit to the farm.

## OFFICE OF POULTRY INVESTIGATIONS AND PATHOLOGY

DR. B. F. KAUPP, *In Charge*

1. A STUDY OF THE DISEASES OF THE FOWL:

*Encephalocele of a Baby Chick:* A case of encephalocele of a baby chick was studied in one case. The eyes were only partially formed with no eyelids. There was a fleshy looking mass protruding from the top of the skull which upon microscopic examination proved to be a portion of the cerebrum.

*A Horny Growth from the Foot of a Hen:* From the top of a Barred Plymouth Rock hen there had developed a horny growth one and one-half inches in diameter at the base and more than two inches long.

*Edema of the Larynx:* Edema of the pharyngeal mucous membrane was studied in a Pit Game cock. The mass, measuring more than two inches long, protruded from the mouth.

*Polypus of the Oviduct:* A case of a tumor measuring two cm. in diameter was located in the oviduct of a hen. This prevented the hen from laying. The tumor was attached to the wall by means of a pedicle.

Many fowls have been sent to the laboratory for study and diagnosis and two outbreaks of a disease resembling fowl typhoid are now being studied and will be reported on in full in the next annual report. These cases were treated by a vaccine made from the germs isolated from the two respective territories. The vaccine proved quite efficient in the treatment.

II. LABORATORY STUDIES:

*Normal Temperature of the Adult Fowl:* In order that we may know, from a clinical standpoint, the normal temperature of the fowl, many series of tests were made. This included taking temperatures of the same fowls in the morning, noon, evening, and at midnight, to determine the average day temperature and also when the surplus temperature was eliminated from the body. It was found that the normal temperature of the adult fowl is 107.4 degrees F. and at night the temperature will fall to 105 degrees F. This knowledge has been of value to us in the study of Fowl Typhoid, in which the temperature ranges as high as 114.5 degrees F., or 7 degrees of fever.

*The Study of Tempature of the Houses with the Draft System and by the Diffusion System:* The unit system house was used in these tests, one end being ventilated by diffusion and the other by draft. It was found that the difference in temperature depended upon the direction of the wind. There was from one to four degrees difference, which makes ventilation by draft slightly in favor of ventilation by diffusion in the summer time.

*Rate of Growth of Single Comb White Leghorns:* A growth curve was established at the central plant for the pullets of the S. C. White Leghorns from hatching to 34 weeks of age, or the time when the pullets go into the laying pens.

The relative value of the various vegetable proteins was published in Poultry Item in a series of ten articles. Animal food is necessary to place pullets into heavy early egg production. Animal food is essential for best growth. When pullets are reared on very limited animal food when put into the laying pens and given a mash with animal food, they soon come into full laying.

In the Veterinary Journal was published under the heading of "A Contribution to the Study of Tumors of the Domestic Fowls," the resut with illustrations of a compound tumor from a Golden Wyandotte cock lympho carcomas of S. C. White Leghorns, Myxo-Sarcoma of a Barred Plymouth Rock cock, and an interesting case of volvulus or gut tie of a hen.

The effects of velvet bean meal upon growing chicks was published in the Journal of the American Association of Instructors and Investigators in Poultry Husbandry.

An article on the rate of growth of the S. C. Rhode Island Reds, both males and females, was published in Poultry Science.

*The Effects of Weather Temperature upon the Temperature of the Hen:* It was found by taking the temperature of the same fowls the first day of each month that the temperature of a fowl that was, say, 107 degrees F. in the winter time may be 110.5 degrees F. in the summer time on a hot noonday. The temperature of the body of the hen is affected by the temperature of the surrounding atmosphere.

*The Normal Respiration of the Fowl:* A study was made of the number of normal respirations made by the hen per minute. It was found that an average sized cock of 8 or 9 pounds will breathe normally about twenty times a minute. A hen of the same breed will breathe about 36 times a minute. This knowledge is of value in the study of disease. A hen with fowl typhoid with a tempature of 114 degrees F., breathes 120 time a minute.

*The Effects of Feeding Hours on Egg Production:* Extending the length of feeding hours on pullets is profitable, but it is not profitable to give a constant 14 feeding hours to laying hens. The second year shows a decrease in egg production. After the first of April the extra light should be gradually lessened to normal daylight till the following late fall or winter when the short days and high priced eggs attain.

*How Long Do a Hen's Toe Nails Grow in 365 Days?* This question was answered by measuring the toe nails of two Barred Plymouth Rock hens at the end of 365 days. They had grown 1.9 cm.

*The Fate of Grit in the Gizzard:* It was found that a fowl may go 365 days without replenishing its grit. At the end of this time there was enough grit in the gizzard of the remaining two hens to grind the food as shown by the fact that the hens were in perfect health and in good flesh.

*The Cost of Hatching Baby Chicks Artificially:* When the eggs cost 30c. per dozen for hatching, a chick was produced for $0.09 and when the eggs cost $1.50 per sitting of 15 eggs the chicks cost $0.29.

*The Effects of Latitude on Egg Production:* This work is in its third year. In the second year the results were similar to those of the first. There are more possible hours sunshine at Winnipeg, Canada, but there are more actual hours sunshine at Raleigh, N. C. The hens at Raleigh weighed heavier than those at Winnipeg, and the birds at Raleigh laid more eggs per hen than those at Winnipeg, Canada.

*The Digestive Coefficients of Poultry Feeds:* A summary is being made of the seven year's work on the determination of the digestive coefficients of poultry feeds conducted on poultry. This covers 19 feeds and 101 individual tests. To the worlds work of 89 individual tests we have added 101, and from this have compiled a table of digestible nutrients of 30 poultry feeds based on poultry digestion trials.

III. ASSISTANTS TO FAIRS OF THE STATE:

During the fall several fairs were given assistance by sending senior students to judge poultry.

Mr. W. F. Armstrong, a senior student in Agriculture, specializing in poultry, judged the Forsyth County Fair at Winston-Salem and also the Johnston County Fair at Smithfield, N. C.

Mr. G. L. Booker, a senoir student in Agriculture, specializing in poultry, judged the poultry at the Person County Fair at Roxboro, and also the Fair at the Franklin County Fair at Louisburg, N. C.

Mr. J. F. Johnson, a senoir student in Agriculture, specializing in poultry, judged poultry at the Old Hickory Fair at Lexington, N. C., and also the Knightdale Community Fair in Wake County.

IV. EXTENSION LECTURES BY MEMBERS OF POULTRY ORGANIZATION:

February 17, 1922, Prof. D. H. Hall gave a talk at Farm Life School at Zebulon, N. C.

February 24, 1922, Mr. J. E. Ivey gave a poultry talk at Farm Life School at Cary, N. C.

February 22, 1922, Dr. B. F. Kaupp gave a poultry talk at Method High School at Method, N. C.

May 2, 1922, talk before Central Carolina Poultry Association meeting at Greensboro, N. C., on European Poultry Observations.

June 29, 1922, a dissection of a fowl and a description of the course of the feed through the digestive tract. Demonstration of caponizing. By Dr. B. F. Kaupp.

August 6, 1922, A talk before the Farmers' Convention on Culling of Fowls with demonstration. By Dr. B. F. Kaupp.

February, 1922, Dr. B. F. Kaupp gave dissection and description of digestion of the fowl before the Virginia State Veterinary Medical Association at Richmond, Va.

Dr. B. F. Kaupp gave a talk before the Madison Square Garden educational program at New York in January 1922 on Things Learned by his European Trip of Poultry Study and gave talks along this same line before the Poultry Science Club, The Research Society, and The Swine Club.

### THE MOUNTAIN POULTRY PLANT WORK

V. POULTRY WORK AT SWANNANOA TEST FARM:

The work intended for the Mountain Plant work was removed from Statesville to Swannanoa in April, 1922. There was some work during the year done at the Iredell Test Farm.

*Velvet Bean Meal Tests:* 14 pounds of velvet bean meal were mixed in each 100 pounds mash mixture. The chicks receiving the velvet bean meal with water weighed an average of 0.84 pounds each at the end of eight weeks, while the chicks receiving this same ration with the addition of milk, weighed an average of 1.15 pounds each and the controls receiving no velvet bean meal but ground oats instead, averaged 1.43 pounds each at the end of eight weeks. The control flock produced a pound gain on 3.19 pounds feed while those on velvet bean meal and milk produced a pound on 4.9 pounds feed and those on velvet bean meal and water produced a pound on 8.1 pounds.

*Value of Eggs from a Farm Flock:* The value of the eggs per hen for the year at the Iredell Farm was $3.01 and the number of eggs was 113 per hen. These hens had been culled two years and the start was made from 76 eggs per hen per year.

### THE COASTAL PLAIN POULTRY WORK

VI. POULTRY WORK AT THE PENDER TEST FARM:

From 100 hens kept at the Coastal Plant $930.30 worth of products were sold, leaving a surplus of 51 fowls at the end of the year in addition to the 100 of the old stock. The net profit per hen, after all overhead had been paid, was $1.67.

*Incubator House Experiments:* The experiments with an incubator house built entirely above ground and on the plan of a sweet potato house proved successful up to the hot weather about the middle of May.

*Animal Feed Tests:* At this station tests are being run to determine the value of the various animal feeds. It is found that for best results birds whether growing or laying must have animal feed such as digestor tankage, meat scrap or milk. These three feeds are about equal from a feed standpoint.

*Rate of Growth:* The rate of growth of S. C. Rhode Island Reds is being carried on. A growth curve representing normal growth is being determined and plotted. From this we can measure the value of the various feeds.

*Cause of Unlivable Chicks:* The cause of weak chicks is being studied. It was shown that chicks made weak from improper incubation would cause a poor hatch, heavy loss as growing birds as well as range birds and heavy loss as layers. The birds were not strong, and transmitted a weakness to their chicks the following year.

VII. MISCELLANEOUS:

*Circular Letters Issued:* 1700 circular letters were issued to boost for the Seventh Official State Poultry Show November 30 to December 1 and 2, 1922.

There were distributed 2,200 bulletins and reprints.

*Correspondence:* During the year 2,196 letters were written to persons inquiring in regard to disease, feeds, feeding, supplies, poultry house construction, where they could buy eggs and breeding fowls, and many other problems confronting the poultry keeper.

*State Association Work:* The head of the Department acted as secretary of the State Poultry Association during the year and was its official delegate at the Annual Meeting of the American Poultry Association which convened at Knoxville, Tenn., August 8-12, 1922. He also gave a talk before the Central Carolina Poultry Association which is located at Greensboro, N. C.

*Culling Demonstrations:* A culling demonstration was given before the Farmers Convention at State College the first week in August, 1922.

*Articles and Papers:* During the year three technical articles have been furnished scientific journals and thirty-six to the Poultry Press. In addition to this there have been issued two popular circulars for distribution in the State, one on the operation of the incubator and the other on culling and feeding.

## OFFICE OF BEEF CATTLE AND SHEEP

R. S. CURTIS, *In Charge*

I. THE EFFECT OF COTTONSEED MEAL ON BEEF AND DAIRY FEMALES IN REPRODUCTION:

This project has been reported on in detail under the Office of Dairy Experimentation with Mr. Stanley Combs in charge. This work is being conducted jointly by the Office of Beef Cattle and Sheep and the Office of Dairy Experimentation, and it is, therefore, considered unnecessary to repeat the accomplishments on the project at this time.

It may be stated, however, that this is one of the big problems confronting the cattle producers of the South, and more especially in the cotton producing areas where the tendency is to feed large quantities of cottonseed meal. Good progress has been made on the project. A report on progress was made at the last meeting of the Southern Agricultural Workers held at Atlanta, Ga.

Great danger in feeding too much cottonseed meal is shown in the tendency toward abortion and abnormal development of the foetus which seems to be lacking in mineral matter in the bones and otherwise a retarded or incomplete development.

II. WINTERING AND SUMMER FATTENING OF CATTLE IN WESTERN NORTH CAROLINA:

The following summary gives the results of wintering cattle in Western North Carolina on various rations, the problem being to determine how cattle can be most economically handled and return the largest profits under these conditions.

| | LOT 1 | LOT 2 | LOT 3 | LOT 4 | LOT 5 | LOT 6 |
|---|---|---|---|---|---|---|
| Number of steers | 25 | 25 | 25 | 25 | 25 | 25 |
| Average initial weight per head | 831 | 826 | 799 | 795 | 827 | 851 |
| Average final weight per head | 764 | 775 | 740 | 741 | 748 | 776 |
| Total gain or loss in weight 112 day period | 67 | 51 | 59 | 54 | 79 | 75 |
| Total cost of feed per head 112 day period | $15.34 | $16.01 | $13.49 | $15.34 | $15.34 | $17.12 |

The following prices were charged for feeds used:

| | | | |
|---|---|---|---|
| Cottonseed meal | $45.00 | Mixed hay | $30.00 |
| Cottonseed hulls | 18.00 | Corn and cob meal | .75 |
| Corn silage | 7.00 | Corn stover | 15.00 |
| Straw | 10.00 | | |

The rations given below were used in the above experiment:

Lot 1 Hay 10 lbs., Cottonseed meal 1 lb., Crushed corn and cob 1 lb.
Lot 2 Hay and straw mixed 5 lbs., Corn silage 15 lbs., Cottonseed meal 1 lb.
Lot 3 Hay and straw mixed 5 lbs., Corn silage 15 lbs.
Lot 4 Hay 10 lbs., cottonseed meal 1 lb., crushed corn and cob meal 1 lb.
Lot 5 Hay 10 lbs., cottonseed meal 1 lb., crushed corn and cob meal 1 lb.
Lot 6 Cottonseed meal 2 lbs., cottonseed hulls 12 lbs.

At the conclusion of this wintering period these cattle were placed on pasture for 140 days with the following gains made by each lot:

| | Lot 1 | Lot 2 | Lot 3 | Lot 4 | Lot 5 | Lot 6 |
|---|---|---|---|---|---|---|
| Average daily gain in pounds | 2.39 | 2.30 | 2.59 | 2.39 | 2.82 | 2.50 |
| Average cost of 100 lbs. gain for total period | $1.98 | $3.09 | $2.75 | $2.98 | $2.53 | $2.84 |

This work shows conclusively that beef cattle cannot only be produced profitably in Western North Carolina, but also that the use of corn silage in a wintering ration and cottonseed meal and hulls in a wintering ration are not detrimental in making gains the following summer on pasture.

It has been thought that these two rations produced deleterious effects, but extended work along this line does not so prove.

III. EFFECT OF COTTONSEED MEAL UPON THE REPRODUCTIVE QUALITIES OF EWES:

The work which has been done at the Central Experimental Farm and the Piedmont Branch Station along this line shows that when these products are fed in moderation that there is no deleterious effect, either in the condition of the animal or in their reproductive qualities. The work shows that the feeding of cottonseed meal may be practiced safely up to three-fourths of a pound per animal daily and with large sheep as much as one pound per animal daily.

The work at the Piedmont Branch Farm was considerably interrupted last year owing to the fact that all of the pastures were plowed up with minor exceptions, and it was necessary to alter the work somewhat. The above results however, are clearly evident.

IV. CLEANSING SHEEP OF STOMACH WORMS:

One of the greatest drawbacks to sheep production in this country, and especially in the South where the rainfall is excessive, is the stomach worm. Up until the past few years this problem has baffled sheep producers and Experiment Station workers. The difficulty has been to get a dosage of treatment of sufficient strength into the stomach of the sheep. It has been found, however, that bluestone or copper sulphate is very effective, and treatments under proper conditions will no doubt save large numbers of sheep.

The following treatment has been tried out and found to be effective:

For ewes three ounces copper sulphate, 100 c. c. water.
For lambs one and one-half ounces copper sulphate, 50 c. c. water.

This treatment should be given after the sheep have been kept off feed and water over night. This is very essential in order that the treatment does not become absorbed by the food in the stomach.

This concludes the fundamental lines of work which are being performed by the various Experiment Station workers. The following pages are devoted to the work of the men in the various extension offices.

# REPORT OF EXTENSION WORKERS

## ANIMAL INDUSTRY DIVISION

The following reports in Extension Work have been reduced to summaries in so far as possible. Because of the nature of the various lines of work it is necessary in some cases to go into considerable detail.

### OFFICE OF DAIRY EXTENSION

J. A. AREY, *In Charge*

I. CONSTRUCTION:

During the past year a considerable part of this work has been transferred to Mr. E. R. Raney, Farm Engineer. However, assistance and plans have been furnished a number of dairymen in building and remodeling dairy barns.

Nine dairy barns have been built new and remodeled into practical barns for producing clean milk. Fourteen concrete, stave, octagon, and wooden hoop silos have been constructed. Eight milk houses have been built new.

CREAMERIES.

Plans and personal assistance have been furnished for erecting the following creameries:

Caldwell Creamery, Lenoir, N. C.

Wilkes Cooperative Creamery, North Wilkesboro, N. C.

Alamance Cooperative Creamery, Burlington, N. C.

II. CHEESE FACTORY DEVELOPMENT:

Twenty-four factories have received assistance from the Cheese Manufacturing Specialists, Messrs. Farnham, Wilson, and Graham, during the fiscal year. The time of these men is supposed to be devoted entirely to manufacturing problems, but the price of cheese reached such a low mark in the early spring that they had to spend considerable time in holding meetings and making personal visits to farmers in order to stimulate sufficient interest so as to make it possible to open several of the smaller factories.

When the price which the factory can pay for milk goes below 10 cents per gallon, which was the case with a few of the factories in the early spring, it is very difficult to get a sufficient amount on which to operate, although this market condition may prevail only a short time.

These factories were organized during the period of the World War when an abnormally high cheese market prevailed. The decline in the cheese market since 1919 has brought a corresponding decline in dairy interest, and only 13 factories have operated throughout the year. Some of these, however, have manufactured more cheese, and cheese of a higher quality, this year than during any previous year of their operations.

During the latter part of this summer the cheese market has advanced, and the managers of several of the factories which did not operate this summer have expressed a desire to open up early next spring, or as soon as the milk supply is sufficient to operate on.

SWISS CHEESE PROJECT

Due to the low market for American Cheese, it was thought advisable to try out the manufacture of Swiss Cheese which usually sells for about twice

the price of Cheddar. So, on September 14th, Mr. E. V. Ellington, representing the Federal Department of Agriculture, Dairy Division, and Messrs, Farnham, Wilson and Arey held a conference at Asheville and decided to start the work in Cove Creek Cheese Factory, Watauga County. The Federal and State Departments of Agriculture entered into the project cooperatively.

A second-hand Swiss Cheese outfit was located in Ohio by Mr. Farnham and purchased by the State Department of Agriculture. Cold and warm curing rooms were built, and on December 2nd the first Swiss cheese was made.

Twenty-three wheel swiss, weighing 2,097 pounds, were made from December 2nd to February 3rd. This lot of cheese filled the curing rooms and at a conference of Mr. S. C. Thompson, U. S. Department of Agriculture, Dairy Division, and Farnham, Wilson, Graham and Arey it was decided to discontinue manufacturing Swiss cheese until those could be ripened and marketed.

It was Mr. Thompson's desire that the work be carried on in an experimental way for twelve months before undertaking it on a commercial scale, due to the uncertainties connected with the manufacture of this type of cheese. At this conference, it was decided that Mr. Wilson should supervise the ripening of the cheese, which required about four months.

The following is a condensed report of the financial outcome of the Swiss Cheese work last year during which time twenty-three cheese were made:

| | |
|---|---|
| Total milk received | 25,950 lbs. |
| Total amount received | $745.80 |
| Received for milk and whey cream | 111.00 |
| Total | $856.80 |
| Natural shrinkage | 10.3% |
| Shrinkage including spoiled cheese | 13.0% |

These cheese were sold to retail stores and hotels. The following shows the factory expense:

| | |
|---|---|
| Salt | $ 11.60 |
| Rennet | 2.50 |
| Seventeen tubs | 17.00 |
| Maker 2 cents per pound cheese | 41.94 |
| Hauling cheese to station | 6.98 |
| Samples | 3.20 |
| Interest on $100.00 investment | 6.00 |
| Incidentals | 16.50 |
| Total expense | $105.72 |
| To 3,017 gallons of milk at 20 cents | $603.40 |
| Total cost of cheese | 709.12 |
| Total sales | 856.80 |
| Profit | 147.68 |

All cheese excepting one graded No. 1. In standardizing milk for the first twenty cheese slightly too much fat was removed which gave a tough body. This was corrected, however, later. A mechanical stirrer, oil incubator and sterilizer have been added to the equipment and the work resumed on September 11th.

At the present time the work is not developed sufficiently to express an opinion concerning its final outcome. The results however, are very encouraging. If it is demonstrated that Swiss cheese can be made under Western North Carolina conditions this will make it possible to obtain about twice the amount for the milk as when sold for making Cheddar cheese.

III. DAIRY SCHOOLS AND SPECIAL DAIRY MEETINGS:

During the year forty-seven meetings, demonstrations, sales, dairy schools and milk consumption campaigns have been held. There was a total of 5,503 people attending these meetings.

The following is a summary of the meetings addressed by the various members of the Office of Dairy Extension:

| | | | |
|---|---|---|---|
| Number meetings addressed by Kimrey | 79 | attendance | 8,015 |
| Number meetings addressed by Farnham | 16 | attendance | 2,129 |
| Number meetings addressed by Graham | 7 | attendance | 282 |
| Number meetings addressed by Wilson | 9 | attendance | 2,147 |
| Number meetings addressed by Clevenger | 20 | attendance | 1,838 |

| | |
|---|---|
| Number Personal Visits, Farnham | 469 |
| Number Personal Visits, Graham | 276 |
| Number Personal Visits, Wilson | 550 |
| Number Personal Visits, Avery | 200 |
| Number Personal Visits, Clevenger | 224 |

IV. FAMILY COW PURCHASING:

Mr. Kimrey has stressed the importance of the family cow in all eastern North Carolina meetings, but on account of the financial depression very little has been accomplished on this project. There is a growing demand, however, for family cows in eastern North Carolina which will no doubt result in shipping several car loads of cows into that section this fall.

Eighteen high grade Jersey heifers and one registered Jersey bull were purchased in Catawba County for Mr. Clarence Lytch, of Laurinburg, and five registered cows at Boomer for Mr. A. G. Bowden, of Hobgood, N. C.

V. BULL ASSOCIATIONS:

Work has been done on four bull associations, but up to date all of these are incomplete. Mr. W. E. Wintermeyer, of the Federal Department of Agriculture, assisted by the local county agent, spent most of August and September working on associations in Caldwell, Iredell and Guilford counties.

Incomplete organizations were perfected in each county which can no doubt be completed in the near future. Two meetings were held at Dobson in Surry County for the purpose of perfecting a county Jersey Breeders' Association. A temporary organization was perfected and a constitution and by-laws adopted. A committee is now soliciting stock to be used in purchasing bulls.

VI. MILK UTILIZATION:

The Dairy Extension Office coöperating with the Office of Home Demonstrations has conducted three milk campaigns during the last fiscal year, one each at High Point and Greensboro during the week of February 20, and the third at Raleigh during the week of March 6.

The usual form of campaign was put on in each city, with good results. Dairymen have reported an increased demand for milk, ranging from 15 to as high as 25 per cent.

Such letters as the following have been received from prominent authorities in the State:

"It is very gratifying to the Health Department to know that the 'Milk for Health' campaign put on by your department in this city, to increase the consumption of milk, and which we believe will result in much good, especially among the school population, was a great success.

"The interest manifested by the school children is certainly wonderfully expressed in the posters exhibited for prizes.

"From reports of dairymen, we estimate already about 40 per cent increase in the consumption of milk. This is very gratifying to the department, as it will, we believe, stimulate the dairymen to put forth a greater effort to better their industry, which will mean the marketing of better milk."

VII. FAIRS AND EXHIBITS:

Exhibits have been put on at the following fairs and special meetings during the past year:

| | |
|---|---|
| Winston-Salem | Pinehurst |
| Raleigh | Wilson |
| Fayetteville | Statesville |
| Greenville | Elizabeth City |
| Tarboro | |

The Winston-Salem exhibit consisted of a dairy products booth, in which were displayed about forty cheese, representing several different types, including Daisies, Loafs, Long Horns, Midgets and Wheel Swiss. There were also five entries of creamery butter and three of farm butter. A similar exhibit was made at the North Carolina State Fair.

In addition to the dairy products at the State Fair, a booth was installed showing the necessary equipment for producing and marketing sour cream. A Bull Association exhibition was also installed to emphasize the importance of using a pure bred sire in grading up a herd. This latter exhibit consisted of Eminent 19th and six of his daughters which had produced 35 per cent more butter fat than their dams.

The dairy cattle exhibit at the State Fair was the largest in the history of the Fair. This exhibit was largely due to the efforts put forth by the Office of Dairy Extension. There were 230 head shown, divided among the different breeds as follows:

Jerseys, 133; Ayrshires, 142; Holsteins, 39, and Guernseys, 16.

The exhibit at the Fayetteville Fair consisted of equipment essential for the production and marketing of sour cream. Those at Greenville, Tarboro, Pinehurst and Wilson were all family cow exhibits. At the Farmers' Picnic held at Statesville, N. C., an exhibit was put on containing charts showing amount of feed consumed, production, cost of production, and profit of the Gold Medal Jersey cow owned by Mr. J. R. Lutz, of Newton, N. C.

This exhibit attracted attention and received much favorable comment.

VIII. CREAMERY MANUFACTURING:

Mr. W. L. Clevenger has direct supervision of this phase of the Dairy Extension work, which has progressed in a very satisfactory way during the year. Practically all of the creameries have had an increase in production and are in good financial condition. The creamery butter production in North Carolina increased in 1921 35.9 per cent over 1920.

Much constructive Dairy Extension work is being carried on, which is bringing about a healthy condition in dairying. The newness of dairying, its problems, and scarcity of home trained men are becoming less noticeable. This is due to the fact that considerable attention and instruction have been given to the management of local creameries, milk plants, ice cream factories, and their patrons.

This work consists largely of giving advice concerning the organization of new creameries, selection of sites, plans for building, purchase of equipment, installation of machinery, supplying creamery records, securing desirable managers, butter makers and helpers, and answering inquiries that aid in making the plants more efficient.

The following tabulation shows the increase in the production of butter since 1917 in which year 988,744 pounds of butter were made. The following years produced: 1918, 852,239 pounds; 1919, 951,046 pounds; 1920, 989,713 pounds; 1921, 1,345,628 pounds.

Many calls have been received relative to organizing creameries in the eastern section of the State. In most cases it has been necessary to advise

against this movement as there were not sufficient cows to support a plant. In each instance cream shipping has been advised until such time is reached when sufficient butter fat is being made to properly support a local plant.

IX. OFFICIAL TESTING:

During the past year 41 breeders have carried on semi-official testing. Eighteen supervisors have been provided to do this work, at a cost of $2,816.30 to the breeders. A news letter is issued each month which gives the names and owners of all cows producing forty or more pounds of butter fat during the month. This letter also carries timely dairying news items, and, I feel, has done much good in bringing about a closer contact between the Dairy Extension Office and our best breeders of dairy cattle.

X. GENERAL:

During the year the Office of Dairy Extension assisted in getting out a circular on Judging Live Stock. Folder No. 5 was also printed, entitled Cow Facts, which has been used quite extensively by banks over the State, which were interested in assisting their farmer patrons in securing good cows. A Calf Club Record Book was also published, which is being used by the Calf Club members. Nine newspaper articles have been written and published in a number of State papers.

With the assistance of County Agent Hendricks, a calf club consisting of 25 members was organized in Catawba County. Instruction is given the members on care of young calves and fitting and showing in the ring. Twenty head were shown at the Catawba County Fair, held at Hickory, and three members gave demonstrations with their calves at the State Fair. This club was organized on a three-year basis, and is the only one to receive the $75.00 premium offered by the American Jersey Cattle Club for the first thirty clubs reporting this year with a membership of twenty.

SALES

During the year assistance was given in conducting the following dairy cattle sales:

| Breed | No. Head | Time | Place |
|---|---|---|---|
| Jersey | 10 | October | Shelby, N. C. |
| Jersey | 50 | November | Charlotte, N. C. |
| Guernsey | 34 | August | Linwood, N. C. |

SUMMARY

| | | |
|---|---|---|
| Miles traveled in auto and by rail | Arey | 14,448 |
| Miles traveled in auto and by rail | Graham | 6,368 |
| Miles traveled in auto and by rail | Wilson | 5,823 |
| Miles traveled in auto and by rail | Farnham | 7,827 |
| Letters written | Arey | 1,872 |

OFFICE OF BEEF CATTLE EXTENSION

R. S. CURTIS, *In Charge*

For the past three years a Beef Cattle Extension man has not been provided, but the writer has, with the assistance of Mr. F. T. Peden, stationed at Springdale, N. C., in beef cattle experimental work, been able to conduct some work. The following are the projects on which work is being conducted or completed:

I. FINISHING BEEF CATTLE:

Realizing that it would be necessary to conduct some work in the boll weevil areas for the purpose of showing farmers how they could best finish and dispose of their cattle, a project was started on the farm of Mr. L. M. Buck, at Scotland Neck, N. C. This particular piece of work has been looked after largely by Mr. George Evans, in the Sheep Field Office.

This work consists of growing out young cattle and forcing them for the market at 20 to 24 months of age. At the present time, two carloads of young cattle are being finished for the market next July. These calves will be fed through the winter and finished on grass, with grain to supplement the ration. The cattle work in eastern North Carolina is distinctly different from the industry in the western part of the State, inasmuch as in this latter section cattle are grazed through the summer and roughed through the winter and sold off grass, with no grain, in the fall.

In eastern North Carolina it will be necessary to work out a supplementary ration, and this is the plan on which we are working on the farm above mentioned.

II. SALES OF BEEF CATTLE:

During the year, assistance was given in conducting the following beef cattle sales:

| Breed | No. Head | Time | Place |
|---|---|---|---|
| Hereford | 20 | October 8 | Fairview, N. C. |
| Hereford | 10 | May 1 | Burnsville, N. C. |
| Hereford | 20 | November 10 | Asheville, N. C. |

Mr. F. T. Peden, who has been largely instrumental in making these sales a success, helped also in the swine sale at Asheville on August 17, when 40 hogs were sold at an average of $30.00 per head. The attendance at this sale was 350.

III. ORGANIZING LIVESTOCK ASSOCIATIONS:

This office attended ten different meetings at Canton, helping to organize the Pigeon Valley Pedigreed Seed and Livestock Company. This company was formed by the owners of six of the best farms in Haywood County.

IV. MEETINGS ATTENDED:

For the purpose of keeping in touch with the work being done on beef cattle in the Southern States, Mr. Peden attended the Southern Cattlemen's Convention at Knoxville, Tenn., on February 14, 15 and 16. He also attended the annual meetings at the Swannanoa Test Farm on August 17, acted as superintendent of beef cattle at the State Fair, and had charge of the beef animals on exhibition at the Livestock Meeting at Statesville on November 22, 23 and 24.

V. LAND CLEARING:

During the time the beef cattle feeding work has been in progress at Springdale, which covered a priod of nine years, numerous questions have arisen concerning the cost of clearing this rough mountain land, seeding it to pasture and making ready for the successful handling of livestock. In order that this might be definitely worked out, Mr. Peden is spending about half of his time from October 1, 1922, to April 1, 1923, in getting cost data on the clearing of the above land.

When this project is closed, figures will be available so that a circular can be issued giving prospective livestock growers in this section a clear conception of the amount of work and cost for putting such land in shape

for cattle. At the close of this work, Mr. Peden will devote his full time to Beef Cattle Extension projects in the eastern and, more particularly, in the boll weevil infested sections.

VI. MISCELLANEOUS:

A large number of letters and circulars have been sent out for the purpose of placing the beef cattle work before the stock men of the State. Where possible, this has been supplemented with personal calls for the purpose of giving help along these lines.

## OFFICE OF SHEEP EXTENSION

GEORGE EVANS, *In Charge*

The work of the Sheep Field Office has been unusually satisfactory during the past year, due to the fact that farmers are becoming much more interested in the production of sheep. This is largely due to the fact that sheep and wool prices have been steadily advancing until now both of these products are bringing good prices.

The following are the projects:

I. DEMONSTRATIONS:

Forty-six demonstrations have been held in sheep shearing, wool tying, docking and castrating. At these demonstrations 164 sheep were sheared, 388 lambs docked and castrated, and 493 people in attendance. After the necessary instructions have been given and a demonstration made, these operations are largely performed by those in attendance. This is for the purpose of giving them real practice along these lines.

Six culling demonstrations were held during which six flocks were culled and detailed information given how to go over a flock and select the ewes most serviceable for breeding. Forty-four people attended these demonstrations. This work is done largely in the same manner in which Messrs. Kaupp and Oliver show the good and bad points of hens in their poultry work.

II. FARM FLOCK DEMONSTRATIONS:

Five farm flock demonstrations were started during the year. These demonstrations are for the purpose of drawing a comparison between a good flock of sheep, properly managed, and an inferior flock, improperly managed. Cost records are kept on feeds, labor, service, pastures, and plowing and seeding of land. At the close of the year a complete record is available, thus showing the income and outgo from the flock.

It is the intention to develop these demonstrations in various sections of the State, inasmuch as conditions vary widely, thus making it necessary to obtain figures depending upon the conditions existing in the section of the State in question.

III. PLACING PURE BRED ANIMALS:

During the year 36 pure bred rams have been placed, 24 pure bred ewes and 100 grade ewes. It will be noted that the number of rams placed is in excess of the number of ewes. This is due to the fact that in developing the sheep industry, like other lines of livestock work, we are strongly advocating good sires, and the use of native foundation animals for the most part.

IV. SHEEP TRUCK EXHIBITS:

This truck, which was fitted up for use last year for the purpose of extending the sheep work in the remote parts of the State, has proved

unusually successful. Eight pure bred sheep are carried in the truck—four rams and four ewes—representing Shropshires, Hampshires, Southdowns and Dorsets.

In addition, all necessary equipment for holding sheep shearing and wool tying demonstrations are carried; likewise docking and castrating instruments, an exhibit showing wool grades, and the various processes of wool manufacturing.

This exhibit has been made at the North Carolina State Fair and the following county fairs and meetings:

| | |
|---|---|
| Tarboro | Hickory |
| Scotland Neck | Statesville |
| Wilson | Fairview |
| Newbern | Gastonia |
| Ashboro | Avery's Creek |
| Leicester | Hominy Valley |
| Columbus | Mill Spring |
| Sunny View | Green's Creek |
| Tryon | |

V. WOOL MARKETING:

The Sheep Field Office assisted the Division of Markets in marketing lambs and calves, and helped in arranging wool in pools in 15 different counties, in which 43,898 pounds of wool was marketed at a price approximately 10 cents above what the average country buyer was offering for wool at the time.

All told, about one month was devoted to this work, which is considered very valuable, inasmuch as it brings the farmers and stockmen interested in sheep in direct contact with the production work. These wool pools are especially valuable, too, in that the farmers have an opportunity to see the wool graded and sold, and receive their money before it is even shipped away. The educational value is unique, and it is the plan to proceed with this work on a similar basis in future years.

In some of the larger wool producing States, where the wool has been shipped to centralizing points, the results secured have not been so satisfactory.

VI. CONSTRUCTION:

This covers the necessary instruction to teach farmers how to build modern, inexpensive sheep barns, hay racks and grain troughs, lamb creeps, hurdles, fences and other necessary equipment on the sheep farm.

This work has been extended from a small way to the construction of an entirely new barn on 130 farms where personal visits were made. Information and aid have also been given in the construction of silos.

VII. SUMMARY:

The following figures represent the total activities of this office:

| | |
|---|---|
| Miles traveled on train | 5,990 |
| Miles traveled by auto and truck | 3,858 |
| Letters written | 1,236 |
| Personal visits | 130 |
| Demonstrations in fitting and trimming | 1 |
| Assisted in wool pools | 15 |
| Sheep sheared | 164 |
| Lambs docked and castrated | 388 |
| Culling demonstrations held | 6 |
| Farm flock demonstrations made | 5 |

| | |
|---|---|
| Meetings attended (special) | 8 |
| Pure bred rams placed | 36 |
| Pure bred ewes placed | 24 |
| Grade ewes placed | 100 |
| Fairs visited by truck | 17 |
| Beef cattle feeding demonstrations | 1 |
| Demonstrations on shearing and wool tying | 46 |

## OFFICE OF POULTRY EXTENSION

ALLEN G. OLIVER, *In Charge*

The following is the principal work accomplished by the Office of Poultry Clubs:

Proper housing and home-made equipment for care of farm poultry.

Furnishing models and blue prints.

Early hatching and keeping of all early hatched pullets.

Feeding mature birds for fall and winter egg production.

Feeding of young growing birds that they reach maturity in the shortest possible time.

Candling and grading eggs for market.

Finishing young cockerels by milk feed wherever possible before shipping to market.

Exhibit of pure bred farm poultry, raised by farm boys and girls, at various fairs throughout the State.

Holding culling and judging schools on farms.

Assisting in organization of poultry associations in many counties.

Purchasing of poultry feeds and shipping coöperatively.

Boys' and Girls' Poultry Clubs sold over 40,000 pure bred eggs for hatching purposes.

Holding educational exhibits at various places.

Practical demonstrations in many counties.

Since the advent of the boll weevil the poultry work has developed in an unusual manner. Because of the large number of people affected, it has become, under certain conditions, almost unwieldy. It is only necessary to say that because of the expansion of this work a second poultry worker has been added, in order that the situation might be properly handled.

The following is a summary of work performed by this office.

| | *Totals* |
|---|---|
| Miles by rail | 10,370 |
| Miles by auto | 4,380 |
| Number letters written | 1,563 |
| Number homes visited | 394 |
| Number farms visited | 394 |
| Demonstrations | 704 |
| Meetings | 942 |
| Attendance | 14,275 |
| Community fairs | 1 |
| Number other fairs and shows | 5 |
| Number members showing | 425 |
| Number birds shown | 1,797 |
| Cash won | $1,388.50 |
| Poultry houses—new | 54 |
| Poultry houses—remodeled | 19 |
| Conferences | 50 |
| Local articles for press | 24 |
| Flocks culled | 188 |

| | *Totals* |
|---|---|
| Number dozen eggs shown | 319 |
| Judging contests | 3 |
| Educational exhibits | 12 |
| Lectures | 241 |

## OFFICE OF SWINE EXTENSION

W. W. SHAY, *In Charge*

The entire activities of this office, with the assistance of Mr. J. M. Watts, have been given over to feeding demonstrations as outlined in the projects below:

I. FEEDING DEMONSTRATIONS:

This work is all done in cooperation with the county agents. This is considered the first requisite to satisfactorily work out the feeding schedules, do the actual feeding work and get accurate reports. Wherever the county agents have thrown themselves into this work actively, good results have been obtained.

This work has been started in 18 counties up to date. In each case where reports have been received a profit has been shown. This particular part of the work is done in cooperation with Mr. V. W. Lewis, of the Division of Markets, and it is very gratifying to know that Mr. Lewis has succeeded in getting a premium of $1.00 per hundred pounds for all hogs fed after the demonstration plan. This amounts to approximately $150.00 in case of a car load.

During the year, considerable time has been spent in working up a system of records which will enable the specialist to follow up each particular demonstration under way. There is no doubt but what the greatest service that can be given farmers is to teach them whereby they can really secure a profit from their herds. No other method seems to bring these results as well as the concrete feeding demonstrations.

Large numbers of letters are coming to the office requesting information on how to properly care for, feed and manage brood sows, on which depends the supply of feeder hogs used in this work. It is recognized that one of the chief troubles to overcome in finishing hogs for market is the softening effect of such feeds as peanuts, soy beans and chufas. This is being given much time in the field in connection with the extension problems, in addition to the constructive work which is being done by the experimental workers.

The following is a complete summary of the work performed during the year:

CONDENSED REPORT OF TRAVEL AND ACTIVITIES
OF THE
OFFICE OF SWINE EXTENSION, STATE COLLEGE STATION, RALEIGH, N. C.
(FOR THE FISCAL YEAR ENDING SEPTEMBER 30TH, 1922)

| 1921 1922 | TRAVEL | | | FEEDING DEMONSTRATIONS STARTED | VISITS TO | | LETTERS WRITTEN | MEETINGS | | ARTICLES WRITTEN | COPY FOR CHARTS, BLOTTER, FORMS AND BULLETINS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | RAIL | AUTO | TOTAL | | AGENTS | DEMONSTRATIONS | | NUMBER | ATTENDANCE | | |
| Oct. | 104 | ---------- | 104 | 0 | ---------- | ---------- | 118 | ---------- | ---------- | 5 | Copy for Chart |
| Nov. | 500 | 20 | 520 | 1 | 3 | 4 | 72 | 1 | 30 | 3 | 1 and 10 Year Average |
| Dec. | 1081 | 167 | 1248 | 13 | 5 | 7 | 98 | 2 | 210 | 2 | Feeding Schedules |
| Jan. | 641 | 360 | 1001 | 16 | 5 | 9 | 146 | 10 | 295 | 0 | " " |
| Feb. | 914 | 62 | 976 | 18 | 3 | 8 | 141 | 2 | 130 | 2 | Circular Letters 2 |
| Mar. | 748 | 377 | 1125 | 2 | 22 | 9 | 125 | 22 | 2560 | 2 | 5 Analysis of Results |
| Apr. | 1032 | 131 | 1163 | 8 | 7 | 12 | 178 | 3 | 133 | 2 | Circular Letter Bankers |
| May | 184 | 190 | 374 | 9 | 2 | 2 | 202 | 1 | 57 | 1 | Analysis of Results |
| June | 1578 | 605 | 2183 | 14 | 8 | 26 | 351 | 0 | ---------- | 4 | Circular Letters 5 |
| July | 1948 | 265 | 2213 | 10 | 6 | 11 | 285 | 3 | 6020 | 3 | Bulletin |
| Aug. | 2339 | 471 | 2810 | 2 | 5 | 4 | 74 | 4 | 50 | 4 | Secy. of State Farmers Convention |
| Sept. | 1298 | 438 | 1736 | 4 | 9 | 8 | 234 | 2 | 172 | 3 | Forms 1 to 17 |
| Total | 12367 | 3086 | 15453 | 97 | 75 | 100 | 2024 | 50 | 9657 | 31 | |

The extension phases of the work are being built on broad, substantial lines. All of the work which is now in progress is fundamental and really comes nearer reaching those in need of the work than ever before. This is due largely to the splendid coöperation which is being received from the various county agents in this State. There is no doubt but what a better understanding is being reached in conducting the field work through the main coöperating agencies under the County Agent system.

Plans are already under way to map out a good program along the most needed lines during the coming year. This will be embraced in reports of the projects which will be explained and plans otherwise fully made at the coming meeting of the county agents next month.

Generally speaking, all unimportant or ineffective phases of extension work are being eliminated and replaced by broad lines of specific work which really reaches the people. This may be well illustrated by the specific feeding demonstrations which are being carried on by the Office of Swine Extension, the work which is being done by the use of the Sheep Extension truck, enabling this office to carry a complete line of equipment, and the culling and marketing demonstrations being carried on by the Office of Poultry Extension.

R. S. CURTIS, *Acting Chief.*

# DIVISION OF ENTOMOLOGY

At the outset of this report I wish to point to two highly important developments:

(1) The State is now entering its period of severe trial by boll weevil; but I point also to the fact that remedies now known have already given highly profitable results in our tests in this State. We are not, therefore, without a remedy, nor are we floundering in the dark. The search is no longer for merely a successful and profitable remedy, but there is prospect (if not already realized) of several profitable methods of control. And in this connection I also report that in its migration for this year (1922) the boll-weevil completed its invasion of our cotton area and has invaded Virginia to the north. Only our one extreme northeast county of Currituck appears for the moment to be free of boll-weevil, and it is due to be invaded in 1923, if not already invaded. We need to carry on an extensive and intensive campaign of education in teaching our farmers and county agents standard methods for control of boll-weevil. Such work will save hundreds of thousands of dollars to the State.

(2) A new and highly important pest, known as "bean-beetle' or "Mexican bean-beetle' or "bean lady-beetle," invaded the southwest counties of Cherokee and Clay in 1921; and during 1922 it has spread into Graham, Swain, Macon, Jackson, Transylvania and Henderson counties. The control of this insect is beset by peculiar difficulties and the present best methods are not entirely satisfactory. It feeds ravenously and destructively on the leaves of the table varieties of snap beans, shell beans and on cornfield beans, and when other food is scarce it freely attacks soy beans and many other less known sorts. A correpondent in Cherokee writes:

"It is regarded to be the most destructive pest that we have had in the mountains. Its damage seems to be greater than that of all the other pests put together."

And a correspondent in Graham writes:

"They ate most all the beans all over the county. The vines were just covered up with them in my plantings. They are the worst pest we have had to contend with."

A year or two ago members of this Board doubtingly asked whether we entomologists had anything to offer in the boll-weevil problem to justify travel, field work, meetings, etc. At that time the now standard method of weevil control had not been tested in this State, but by reason of your appropriations and support we proceeded to trace the weevil's spread; we have taught the up-to-date gospel of

control, and now we have definite results to show, which prove that control is possible, practicable and profitable. If we are to take a hesitating and doubtful attitude on this new bean-beetle, we will not know its progress, will not have close touch with its ravages, and will be but ill-prepared to speak with authority regarding the methods of control. On the other hand, if we will face the issue with such means as we have, keep in touch with the spread, keep wide awake on the matter of remedies with tests of our own, we can keep our people better informed and can take quicker and more certain advantage of any improved methods which may be discovered. And I have strong hope that such improvements will soon be found by the insecticide chemists, if not by the entomologists themselves. I am asking the Board to provide for special work with this pest.

These two: boll-weevil and bean-beetle are the outstanding new issues for the year ahead of us, and perhaps for several years.

## INSPECTION WORK

*Nurseries*—In 1920 the number of nurseries inspected and licenses was 52, in 1921 it was 62; this year (1922) it has been 69. This indicates an increase in this routine of our work, yet Mr. Mitchell, by careful management, has kept this work well in hand, with no severe increase in the cost of the service.

*Boll-weevil.*—At the close of 1921 the northern line of boll-weevil infestation ran approximately from Hickory to Salisbury to Raleigh, to Washington, to Belhaven. The spread of this year (1922) has carried it throughout our cotton area (except Currituck County) and into Virginia. This was accurately determined by specimens from farmers and county agents, and by our own inspections. The mere question of the *spread* of boll-weevil is, therefore, over, so far as North Carolina is concerned.

*Bean-beetle.*—Inspections by our workers during the autumn has shown that this new pest has spread nearly (but not yet quite) to Waynesville and Hendersonville. During 1923 it will probably reach Asheville and perhaps the Swannanoa Test Farm.

## CHIEF WORK OF THE YEAR ON DEFINITE PROJECTS

*Potato Spraying.*—At Swannanoa Test Farm potatoes sprayed according to our standard program yielded 53 bushels more potatoes per acre than the unsprayed. We have run this test through quite a series of years, and the accumulated data is absolutely convincing. We have proven the value of the method, and published the method, and gradually—though not so rapidly as we might wish—farmers and county agents are coming to recognize this as a standard part of the potato-growing procedure.

*Insect Survey.*—This project embraces a general study of the entire insect life of the State, including all species. In 1919 the green clover worm (before harmless with us) suddenly assumed importance, and the records of our insect survey project gave us a first basis for our work. During this year (1922) a caterpillar heretofore harmless caused great uneasiness by stripping oak trees of their leaves in midsummer, through the central part of the State. Our insect-survey records were again consulted, and showed it to be a native (i.e. not a "new") insect, which indicated that the outbreak would be only temporary, and this proved to be true. In like manner, this study of all of our insects enables us to accurately identify many harmless insects which are mistaken for destructive ones (as in many cases with alleged boll-weevils), and enables us to allay needless fears.

Under this project, our collections and records have grown to the point where they are of economic and biological importance and are certainly equal to anything that can be shown in the Southern States.

During the year, 235 species have been added to our lists, making 6,344 species of insects now known to exist in the State.

*Boll-weevil.*—Accepting the calcium-arsenate dust method as developed by the U. S. Department of Agriculture as our standard, we undertook to guide aright those of our farmers who desired to use it, and also to follow it through with the care of experimental work, with as many as we could. From information at hand, we conclude that upwards of 50 farmers did some dusting to control weevil and that in the total around 50 tons of calcium arsenate were used. Field Stations were established at Wadesboro, in Anson County, and at Laurel Hill, in Scotland County.

The more careful work was done on five farms in Scotland County, by Mr. Mabee, of our Extension Service. At the moment of writing (November 22) the final figures on the yields have not all been received, but already the results show an average for the five cases of over $25 worth of cotton *increase* per acre, as a result of dusting treatments costing not over $5 per acre for the season. This surely gives a basis upon which we may safely recommend the dust method. Yet it will take time to reach the majority of our best farmers and, through them, the general mass of less intelligent ones, with this information. Of course, there are conditions to be met, and errors to be avoided, just as in any new procedure which requires intelligence, skill, persistence and judgment. There is no magic nor miracle about it. I am recommending to the Director of Extension that provision be made whereby we may enlarge our extension work with this insect, without neglecting others.

*Peach and Plum Curculio.*—For several years the peach growers in our "Sand Hills" have complained that the curculio is increasing in

destructiveness, causing a high percentage of the choice later varieties of peaches to be "wormy" and unsalable at harvest.

With a cooperative understanding with the Bureau of Entomology at Washington, Dr. R. W. Leiby, of this Division, took up investigational work on this problem, with Mr. John B. Gill, of the Federal Bureau, to carry on extension features of the work. A field station was conducted at Aberdeen through the season. By a combination of winter clean-up, spraying and gathering of "drops," the percentage of wormy fruits at harvest was reduced from 38 per cent (over one-third) to 6 per cent (less than one-seventeenth). This work met with instant appreciation and response on the part of the growers, and we are planning to continue this work another year. The peach industry of our Sand Hills is one of the very highest agricultural assets of our State, it alleviates the boll-weevil problem in that section, and this work has been highly helpful to the growers and highly creditable to the Department.

*Bean Beetle.*—To the present, our work with this insect has consisted of correspondence and scouting work, to determine the limits of spread. We shall fail of an important duty and opportunity if we do not undertake field work with it during the ensuing year, and I am making provision for this in my budget estimates. This insect is an invader, like the boll-weevil, and not a native like the green clover worm of 1919 and the oak worm of this summer. It is my plan to establish a field station in the infested territory, as has been done with clover worm, boll-weevil, curculio and canker worms. Ample experience has convinced us that the field station idea is, by all odds, the best for securing information and for reaching the public.

*Beekeeping.*—This work, which is an extension project, has been carried on by Mr. C. L. Sams with his usual care and energy. This work is now of such long establishment that I need not explain its benefits. As a source of supplementary income it is important to many farmers, and there are a number who are making it one of their chief lines of work. The exhibits at the State Fair for the past several years have reflected the increasing interest in this subject.

## BUDGET

In submitting the estimates for the Division of Entomology, I have in mind the continued necessity for economy; yet I must also recognize the importance of the issues which face us. At this moment of writing it appears that during the year we have slightly overdrawn our funds on one item, but are well inside it in others, so that in the total I believe we are on the safe side. At any rate, every undertaking has seemed necessary, and I know that the Board has never wanted us to go backward. We have tried to make each dollar do its duty, and I shall

expect to require the same of all dollars which you can place at our disposal for the coming year.

ACKNOWLEDGMENT

As in preceding reports, I wish to acknowledge the continued interest and support of the Board, the Commissioner and the Director of Extension, and the loyalty, integrity, industry and efficiency of every member of our force.

Respectfully submitted,

FRANKLIN SHERMAN,
*Chief in Entomology.*

# HORTICULTURAL DIVISION

## Introductory

The greatest interest in both commercial and home horticulture that has ever existed in the State has resulted from the operation of existing agricultural conditions in the State and conditions in horticultural industries, which include the general economic need for diversification, boll-weevil conditions and a realization of the advantages of the State for different horticultural crops.

This increased interest has resulted in the largest demand ever made on the Division of Horticulture for extensional and investigational activities. There are more opportunities for service in both phases of the horticultural field than ever before. This is evidenced by the fact that the correspondence has doubled in 18 monthhs, due to direct inquiries for information and that more consultations and conferences are solicited than can be met.

The work of the Division consists in general administration, correspondence, work of a general horticultural nature, experimental work in pomology and vegetable culture, and the extension work in pomology and vegetable culture.

## Apple Industry

The commercial apple industry in the western part of the State is making a gradual development. The splendid natural and economic advantages that our mountain counties possess for apple growing are being realized, and the next few years should witness an increase in commercial planting in this section. Western North Carolina stands out as the greatest undeveloped apple empire east of the Mississippi, when measured from the standpoint of the natural advantages of soil, climate, water and atmospheric drainage, rainfall and the region's demonstrated ability to produce fruit of first quality on the one hand; and the economic advantages of cheap lands, low cost of production and proximity to consuming markets on the other hand. North Carolina normally ships slightly over 600 cars of apples a year.

## Peach Industry

No horticultural industry in the State is making a more rapid development than the peach industry in the Sand Hill section of the State. During the season of 1920, 351 cars of peaches were shipped from the section, which was the largest amount shipped up to that time. In 1921, a marked increase was made—589 cars being shipped. During the season of 1922, 1,435 cars were shipped. The section has over 10,000 acres planted to peaches. Each year the industry has been profitable, and it has not reached the limits of its growth by any means, as yet.

### STRAWBERRY INDUSTRY

For a number of years the strawberry industry in Eastern North Carolina has lost ground because of higher prices for tobacco and cotton and the scarcity of labor. During the last few years there has been renewed interest developed in the industry because of the deflation of other money crops, and an increased carload shipment in the State has been reported. In 1921, 479 carloads of strawberries were shipped from the State, while in 1922 the crop totaled a shipment of 1,105 cars. It is estimated that next year there will be approximately 2,000 carloads shipped during the season.

### SWEET POTATO INDUSTRY

Even in its undeveloped state, the sweet potato industry is at present our most important horticultural industry. Its prosperous and safe development is dependent upon the development of an economic and effective system of storage and distribution. This fact is becoming generally realized, and the past season has seen the largest increase in storage house capacity of any season. A still greater building program is forecasted for next year. During this season a number of local associations of sweet potato growers have been organized, and an Eastern Carolina Sweet Potato Federation, which is composed of a number of its locals, has been organized to market the crop.

Many cotton sections, discouraged by the destructive work of the boll-weevil, are turning to the sweet potato as a money crop, and are planning extensive storage houses in which to store the crop.

In 1920, North Carolina shipped 750 carloads of sweet potatoes; in 1921, 884 carloads were shipped; in 1922, 1,014 cars were shipped.

### IRISH POTATO INDUSTRY

From the standpoint of carlot shipments, the Irish potato industry is the most important horticultural industry in the State. There are really two phases of this industry; one, the early Irish potato industry, in the Coastal Plain, and the late crop or storage industry, in the western part of the State. In 1922, the early crop shipments from the Coastal Plain totaled 3,600 cars.

### ADMINISTRATION

A large part of the time of the Chief of the Division of Horticulture is employed with matters of the administration of the Division. This work consists, for the most part, in planning and directing the experimental work at the branch experiment stations and in planning for the various lines of horticultural demonstration work throughout the State. With the growth and development of the experimental and demonstration projects, these duties are increasing each year.

### Correspondence

The requests for information regarding different horticultural crops make extensive demands on different members of the Division for handling correspondence.

As the Division grows in scope of work and in its usefulness to the horticultural interests of the State, the amount of correspondence increases each year. While the nature of the correspondence covers many horticultural subjects, the larger part of it consists in supplying information and advice to fruit and truck growers of the State and to people from outside the State in regard to the horticultural possibilities of the section.

The correspondence ranges from 300 to 500 letters a month, aside from circular letters. The growing correspondence indicates the usefulness of the Division to the fruit and truck growing interests of the State.

### Fruit Crop Estimate Reports

To facilitate the compiling of the fruit crop estimates, an arrangement was made with the North Carolina Crop Reporting Service to do this work on a coöperative basis.

The fruit crop estimates issued by this office have been in much demand by the agricultural press, by the secretaries of the state horticultural societies and by Marketing organizations throughout the country. To compile these fruit crop reports, it has necessitated an extensive correspondence with growers and a large amount of work in tabulating figures.

### The Cooperative Rotundifolia Experiment Vineyard
*(Truck Station, Willard, N. C.)*

The Rotundifolia vineyard established in cooperation with the United States Department of Agriculture at the Truck Station has furnished, through the work of Mr. Charles Dearing, Horticulturist of the United States Department of Agriculture, much valuable information regarding the training and management of Rotundifolia grapes, and in the making of grape products. Mr. Dearing has made much progress in the determination of the most desirable varieties, in the breeding of improved strains of existing varieties, and in the production of new varities of economic importance.

### Experimental Work in Pomology

1. Variety Work in Pomology. (C. D. Matthews, J. M. Dyer and E. D. Bowditch.)

The experimental work of the Division is being continued along the lines of the projects described in previous reports.

Considerable attention has been given to a more thorough direction and organization of the work. The organization of investigation so

that direct attention to problems of outstanding importance may be developed has been borne in mind. Every attempt is being made to develop a program of work which will contain live projects definitely adapted to fundamental and special problems of the State. The projects are being organized so that problems of first importance will be selected and so that the expenditure of funds and energy on problems of only local application will be limited. Every project is reviewed each year with a critical attitude to see if it is fulfilling the purpose for which it was intended.

In general, satisfactory progress should be reported in the experimental work with apples, peaches, pecans, sweet potatoes and Irish potatoes. Certain specific projects were discontinued temporarily because of the lack of funds to properly conduct them.

The training and pruning experiment with apples being conducted at the Mountain Station is one of the outstanding pieces of work of the Division. This is one of the most comprehensive pruning investigations being conducted by any station. The press of the western part of the State has published an account of the work during the last two years with the result that fruit growers are following it with much interest. In addition to being an investigation, this work is a valuable demonstration of different systems of training and pruning. The results so far secured indicate that growers have been pruning too severly, thereby causing a reduction in fruit production.

The work with pecans further proved the value of the Schley, Stuart, Alley and Success varieties for Eastern North Carolina. Additional proof of the value of the Coastal Plain Section for pecan production was secured. The importance of cultivation of pecans during dry weather was further emphasized.

Very successful results were secured with sweet potato investigations at the Pender Farm. The work was off particularly practical value this year because the growth of the commercial industry made an unprecedented demand for information furnished by the investigations. The project included cultural practices, varieties, storage, seed selection and handling.

The Irish potato work has again proved the value of the Rural New Yorker group for production and storage in Western North Carolina. The important work of developing seed strains in Western North Carolina for Eastern Carolina is being conducted vigorously. If this project works out a method whereby superior seed can be produced for use in the Coastal Plain, a large seed potato industry can be developed in the western part of the State which would prove of mutual advantage to each section.

J. M. Dyer, assistant horticulturist, resigned, to enter horticultural work in Arkansas. He was succeeded by Mr. E. D. Bowditch.

With the development of many new horticultural industries in North Carolina and with future progress in established industries there is an

increasing number of problems for investigation. To adequately cover the investigational field presented by the increase of horticultural industries it will be necessary for the Division to receive additional funds and to be provided with additional facilities to adequately conduct this work.

Notes and observations on the behavior of varieties of fruits in the different sections of the State are made from year to year. These notes and observations show the range of adaptability of the varieties in different sections.

Much time and care is expended each year in writing, revising and checking descriptions of almost all of the important varieties of fruit grown in the State. These descriptions are to be used in future publications, and are employed by the Division as an aid in indentifying varieties of fruit sent to the office from over the State.

2. NATIVE FRUITS OF NORTH CAROLINA. (C. D. Matthews.)

The place of origin, the history, and the description of a number of varieties of North Carolina origin have been secured. When opportunity offered, the descriptions of varieties secured previous to this season were verified. Paintings and photographs have been made of the most important varieties.

3. INVESTIGATIONAL WORK WITH PEACHES. (Mountain Station, Truck Station, Piedmont Station, Coastal Plain Station.) (C. D. Matthews, J. M. Dyer, and E. D. Bowditch.)

*(a) "Dehorning" Peach Trees.* No active work done on this project during the year.

*(b) Peach Breeding.* It is the object of this project to produce improved commercial varieties that are more suited to North Carolina conditions than are the present varieties. It is the purpose to produce varieties hardier in bud than the present commercial sorts.

To provide working material for this project, a variety orchard containing over 60 different varieties of peaches was planted at the Truck Station during 1917. These trees have made a very satisfactory growth since being planted. During the last year nearly all varieties had a partial crop and some very valuable preliminary work was done in regard to collecting data concerning the characteristics of the different varieties. There is a good set of fruit buds on the trees, and active work is to be done on this project during the following year.

*(c) Hardiness of Peach Varieties in Western North Carolina.*

Twenty varieties of peaches, comprising varieties adapted both to extreme northern and to southern conditions, were planted at the Mountain Station in the spring of 1919, to furnish material for work on determining the relative hardiness of different peach varieties in Western North Carolina. These trees have made a very satisfactory growth since being planted.

(*d*) *Phenological Studies with Peaches.* The practice of collecting phenological notes on the peach varieties in the varietal peach orchard at the Truck Station was started during the spring of 1920. These notes will be of immense value in handling the breeding project.

(*e*) *Variety Testing with Peaches.* No active work was done on this project because the crop at the Truck Station was killed by late spring frosts.

4. INVESTIGATIONAL WORK WITH PECANS. (Truck Station, Coastal Plain Station and Piedmont Station.) (C. D. Matthews, J. M. Dyer and E. D. Bowditch.)

(*a*) *Variety Testing.* Thirty-two of the most important southern varieties are included in this test which has been conducted for 15 years. Gratifying results are being secured from this work, as certain varieties are showing marked adaptability to North Carolina conditions while others are proving to be undesirable. At this time, valuable recommendations regarding pecan varieties for planting in this State can be made. According to the results secured, the Schley, Stuart and Alley varieties are the most desirable for Eastern North Carolina.

(*b*) *Individual Tree Performance.* The securing of performance records of the individual pecan trees in the experimental orchards at the several stations is being continued from year to year. Such a record affords a more detailed study of the behavior of the different varieties. As a result of the individual tree performance records, it has been noted, that trees of the same variety under indentical conditions are uniformly heavy yielders, while others are very poor producers, that some produce uniformly large nuts and others uniformly small nuts. As these individual performance records suggest the possibility of improving and standardizing individual yields by bud selection, work has been started along this line.

(*c*) *Cultural Practices.* The value of correct cultural practices, such as tillage and the use of cover crops, is clearly shown in the increased size of trees and in the increased size and number of nuts produced when compared to trees and their products grown in sod. To determine the most desirable system of tillage and cover cropping to be employed in pecan orchards, work of this nature is being conducted at the Branch Stations.

(*d*) *Pecan Breeding.* The seedlings, as a result of pecan breeding work, that were set in 1915 at the Truck Station, are making a satisfactory growth. Some of these seedlings are of bearing size and should produce some nuts during the coming year.

(*e*) *Top-working Pecan Trees.* The investigations dealing with the methods of budding and grafting employed in top-working pecan trees was continued this year. It has been found that a combination of both grafting and budding should be used to secure the most satisfactory

results. As a result of years of investigation, it is the opinion of this Division that top-working should be confined, as a general rule, to trees not over 8 to 10 years old, to be entirely successful.

(*f*) *Cracking Tests with Pecan Varieties.* The cracking test of the the different varieties is made each year. The cracking test is a necessary adjunct to the performance record of a given variety in determining its value in a certain section. Very often a variety is highly satisfactory from a productive standpoint, but the cracking test shows it to be nearly worthless from a utility view point. The cracking test shows the number of nuts per pound and determines the per cent of unbroken halves the variety will crack out, the per cent of faulty nuts, and shape and size of the kernels, the texture, quality and flavor of meat, the per cent of meat and the thickness of shell. As a result of these cracking tests conducted each year, certain varieties that were satisfactory from a productive standpoint proved to be totally unsuited to North Carolina conditions.

5. INVESTIGATIONAL WORK WITH STRAWBERRIES. (Truck Station.) (C. D. Matthews and L. H. Nelson.)

(*a*) *Variety Testing.* This project was discontinued temporarily because of lack of funds. The variety testing project with strawberries was initiated several years ago with the purpose of determining whether or not there were any other varieties more desirable as commercial market varieties than Klondike and Missionary, the two leading commercial varieties.

For this State the most profitable berry combines the characteristics of productiveness, earliness, and shipping quality. None of the varieties so far tested have shown themselves superior to Klondike and Missionary as commercial varieties. Several of the varieties have shown themselves valuable for home use.

(*b*) *Cultural Practices.* During the year, experiments to determine the most desirable planting dates were conducted as well as work to determine the value of removing blossoms and cutting runners. This project has not been in operation a sufficient length of time to furnish any conclusive information.

6. INVESTIGATIONS WITH APPLES. (C. D. Matthews, J. M. Dyer and E. D. Bowditch.) (Mountain Station, Piemont Station and Truck Station.)

(*a*) *Pruning.* (Mountain Station.) The pruning project was begun during 1919 with the intention of securing information on the desirable height to head apple trees, to determine the comparative value of the open head and the modified leader system of training, and to secure information on the amount of annual pruning most desirable. To supply material for this work, an orchard containing approximately

128 trees was planted at the Mountain Station in the spring of 1919. The trees have made a very satisfactory growth and the first and second year's work has been completed as planned.

*(b) Apple Thining.* (Mountain Station and Piedmont Station.) Experiments to determine the effect of thinning fruits and leaves from the fruit spurs of the apple were initiated. Work on this project has not been conducted a sufficient length of time to supply information on the subject.

*(c) Summer Apples.* (Truck Station.) The summer apple orchard at the Truck Station did not produce a crop this season because of frost injury.

## EXPERIMENTAL WORK IN VEGETABLE CULTURE

1. INVESTIGATIONAL WORK WITH SWEET POTATOES. (Truck Station.) (C. D. Matthews and L. H. Nelson.)

*(a) Variety Testing.* It is the purpose of this work to determine the most desirable varieties of sweet potatoes for Eastern North Carolina from the standpoint of productivity, market value, keeping quality and quantity. There were 29 varieties under observation this year. The results were, in the main, confirmatory of the work of previous seasons. Certain varieties have proven their desirability while others have shown themselves to be undesirable.

*(b) Storage.* In connection with the variety work, storage tests are being made from year to year in the storage house to determine the behavior of the different varieties in storage. Certain varieties have proven themselves to be better keepers than others.

To facilitate the storage investigational work, an additional curing room was constructed during the summer.

Investigations to determine the relation of time of digging to keeping quality, the relation of proper harvesting to keeping quality, the proper method of curing, and the correct management of the house, have been continued this season.

As a result of this work, the Division can authoritatively make recommendations regarding varieties for storage and the most desirable methods to employ in the management of the storage house.

*(c) Cultural Practices.* During the year, work was conducted to secure information on the following different cultural practices:

(1) The comparative value of slips vs. vine cuttings as regards productivity.

(2) The effect of ridging on productivity and type of potatoes.

(3) The effect of vine cuttings on yield.

*(d) Seed Selection.* The following lines of work dealing with the seed selection of sweet potatoes were conducted during the year.

(1) To determine the relative value of seed stock from high yielding

and low yielding hills as regards productivity and uniformity of potatoes.

(2) To determine the relative value of vine cuttings as compared with slips for maintaining yield and type, commencing from the same hill.

(3) To determine the comparative value of large and small potatoes for seed.

(4) To determine the comparative value of seed from late vine cuttings and seed from main crop draws as regards productivity, type, and keeping quality.

Very satisfactory progress should be reported on this project for this year.

2. INVESTIGATIONAL WORK WITH IRISH POTATOES. (Mountain Station and Truck Station.) (C. D. Matthews, L. H. Nelson and S. C. Clapp.)

(*a*) *Variety Testing.* (Mountain Station.) The testing of varieties of Irish potatoes to determine the most desirable varieties for Western North Carolina conditions was continued this year with 20 varieties. The testing has been in progress for a sufficient length of time to afford this Division with the necessary information to make reliable recommendations regarding the choice of varieties for the western part of the State.

(*b*) *Variety Testing.* (Truck Station.) Satisfactory progress should be reported on the work to determine the most desirable early varieties for Eastern North Carolina and the best varieties for the second crop.

(*c*) *Hill and Tuber Unit Selection Work.* (Mountain Station.) The hill and tuber unit selection method of variety improvement is being employed in an attempt to produce strains of the best varieties with greater productivity and more desirable characters.

(*d*) *Cultural Practices.* (Truck Station.) Work was conducted to determine the effects of different cultural practices on the yield of potatoes. Practices receiving consideration were:

(1) Width of rows.
(2) Distance apart in the rows.
(3) Freshly cut or stored cut seed.
(4) Effect of sprouting on yield.
(5) Cut versus uncut seed.

(*e*) *Testing the Value of Different Sources of Seed.*

Experiments were conducted to determine the comparative value of Maine grown seed, second crop seed produced in the Coastal Plain, and Western North Carolina seed for the early crop of Irish potatoes in Eastern North Carolina.

This work has not been in existence a sufficient length of time to furnish conclusive results.

(*f*) *Investigation of Methods for Producing Seed Potatoes in Western North Carolina for use in Eastern North Carolina.*

Two methods of attack are being used in this investigation—one consists in growing the seed at different elevations, while the other consists in planting the potatoes at different times in the spring and summer. In both cases it is intended to secure seed at different stages of maturity. At present, results indicate that elevations over 2,500 feet will grow desirable seed for Eastern Carolina.

3. INVESTIGATIONAL WORK WITH CABBAGE. (Mountain Station.) (C. D. Matthews, L. H. Nelson and S. C. Clapp.)

(*a*) *Variety Testing.* The testing of varieties of cabbage to determine the most desirable varieties for Western North Carolina was continued this year. The testing has been in progress for a sufficient length of time to afford this Division with the necessary information to make reliable recommendations regarding the choice of varieties for the western part of the State.

4. OBSERVATION GARDEN. (Truck Station.) (C. D. Matthews, and L. H. Nelson.)

The all year observation garden at the Truck Station which has proven so valuable in the past in supplying information regarding varieties and planting dates of different vegetables for Eastern North Carolina was not continued throughout the year because of the lack of funds.

5. EXTENSION WORK IN HORTICULTURE. (C. D. Matthews, W. W. Magill, Frank E. McCall and R. F. Payne.)

Extension work in horticulture has continued to increase in value and usefulness to the horticultural interest of the state. Each year, there is an increased number of calls for demonstrations. The demand for horticultural assistance has developed to such an extent that it has necessitated reorganizing horticultural extension work on a definite project basis so that the activities of the extension workers can be directed where they are most needed. The work is planned to reach groups rather than individuals. This plan has brought about closer working arrangements between the county agents and extension workers. The Division has relied on the county agents to work up county and community groups for the different projects.

The success of the extension work in a state depends upon determining the real problems of horticulture, the soundness of principle on which the work is conducted, the degree of efficiency developed in presenting the demonstration, and the extent to which the practice demonstrated is actually adopted in the community.

An earnest effort has been made to determine the most important problems in horticulture in the State so that the horticultural extension work could be organized on a logical basis and so that the maximum

amount of service could be performed. A logical and well balanced program of extension work is based upon problems of both commercial horticultural crops and those of home importance. A close study of the horticultural development and possibilities of the State has been made to determine the commercial and home problems.

The commercial interests of the State have been studied from the viewpoint of the problems of existing industries for which the certain sections of the State have special natural and economic advantages. Similar study has been made with the home aspects of horticultural extension.

Some of the more important problems with reference to the horticultural development as outlined above are:

(1) More thorough pruning and spraying in commercial orchards.

(2) More home orchards and more careful attention to home orchards on North Carolina farms.

(3) Home gardens for both rural and urban families.

(4) A better distribution of the sweet potato crop through the use of storage houses.

(5) Improved cultural practices in both sweet and Irish potato production.

(6) The need of closer association among growers and the development of organization in handling their business rather than the development of the individual system.

(7) More attention to beautification of the home grounds.

A definite and logical program for horticultural extension, combining definite objects to be accomplished with definite plans of work, has been developed on the project basis so that these problems could be met. The program is divided into commercial and home phases and is composed of the following projects:

### COMMERCIAL FRUIT PROJECTS

(1) *General Demonstration Work in Pruning and Spraying.*

General demonstrations in pruning and spraying in cooperation with the county agent, conducted in young orchards, mature orchards and old orchards. Agent to select orchards, provide pump and material, advertise date and secure crowd.

(2) *Orchard Plot Demonstration in Pruning and Spraying.*

Three plots in commercial orchard are used, showing value of pruning and spraying. Orchards must be located in good apple producing counties, with typical orchard for the section, near good roads, more or less contiguous to other orchards, with problems of the section. On a cooperative basis with county agent and owner. Three year basis for operation, maximum of eight meetings a year. Accurate records to be kept on cost and effectiveness.

(3) *North Carolina Apple Show and Fruit Growers Conference.*

An apple show to stimulate the development of the apple industry together with a program to supply information to growers so that the best orchard practices may become more generally employed. Cooperation with the county agent in selection, packing, and exhibiting fruit from the different apple counties.

(4) *Consultation Work in Orcharding.*

Consultations with county agents and commercial orchard owners on special and individual problems.

TRUCK PROJECTS

(5) *Sweet Potato Industry—Storage.*

In cooperation with county agents and progressive organizations, meetings to stimulate interest, information on varieties, production methods, harvesting, curing and storage, showing model house, follow up. Demonstrations in harvesting, grading, handling, and operation of storage house. Plans of house construction, rules for operation, points of caution and care, news articles, bulletins. Consultations on construction of large houses, with assistance in operation. Confined to counties suitable to commercial production.

(6) *Irish Potato Seed Certification.*

In cooperation with county agents and cooperative seed potato growers organizations, certification service of three field inspections and one bin inspection with rules of seed production supplemented by demonstrations.

(7) *Consultation Work in Truck Growing.*

Consultations with county agents and commercial truck growers on special problems.

HOME FRUIT PROJECTS

(8) *General Demonstration Work in Pruning and Spraying.*

General demonstrations in pruning and spraying in cooperation with the county agent, conducted in young orchards, mature orchards and old orchards. Agent to select orchards, provide pump and material, advertise date and secure crowd.

(9) *Demonstration Home Orchards.*

In cooperation with county agent featuring this project. Visits made, demonstrations in pruning, spraying, and management given.

### TRUCK PROJECTS

(10) *Home Garden.*

Organization of rural and city garden clubs, under direction of county agent and home demonstration agent. Plans and records on request. Bulletins, circulars, press stories and general information. Demonstration gardens.

In the organization of demonstration work, it has been found that the definite project plan and program basis is the most satisfactory system. A descriptive list of horticultural extension projects is sent to each county agent, so that he can select those projects best meeting the needs of his county to include in his plan of work for the coming year. At the County Agent Conferences of the different districts the scope of the different projects is explained in detail as is the manner of conducting them. The agents submit their program for horticultural work to the specialists and a cooperative program between the agents and specialists is worked out and any readjustments necessary are made so that a definite year's work is planned with certain objective points and methods of attack fully outlined.

A statistical report of the work shows 179 visits to agents and 309 visits to others, 164 meetings conducted with a total attendance of 11,804, travel by rail 16,332 miles and by auto 4,741.

### APPLE WORK

In November 1921 a county agent's school and conference was held at Asheville for the agents of the Mountain District, at which all phases of the development of the apple industry were discussed.

The Division has been instrumental in securing for Western North Carolina a large amount of valuable advertising of its advantages for apple production through agricultural papers of county-wide importance. Only recently it was able to have the section written up in the May 20th issue of the *Country Gentleman.* The Asheville Chamber of Commerce has secured 10,000 separates of this article for distribution out of the State. Such articles are of unlimited value in focusing attention on the advantages of Western North Carolina for apple production.

Pruning and spraying are the two productive practices that are the limiting factors in apple production in North Carolina. Definite projects and definite demonstrations with pruning and spraying have been conducted by the county agents in the principal orchard sections. A statistical summary of the work of these projects shows 26 visits to agents, 53 visits to others, 56 meetings held, with a total attendance of 1,476 people, 156 miles traveled by auto and 1,663 miles by rail.

### PEACH WORK

The Extension Horticulturist cooperated with the Hamlet Chamber of Commerce in conducting the First Sand Hills Peach Show.. An

extensive educational program under the direction of the Extension Horticulturist was given at this meeting, at which there were over 1,000 farmers and peach growers.

### GENERAL FRUIT

General demonstrations with pruning and spraying and the home orchard were held throughout the State. A statistical summary of this work shows 28 visits to agents, 43 visits to others, 35 meetings with attendance of 1,087, 563 miles traveled by auto and 5,464 miles by rail.

### SWEET POTATO INDUSTRY

The progress in sweet potato storage and in the sweet potato industry is one of the outstanding pieces of work in the Division. More assistance has been given to this industry than in any previous year. Approximately 250 plans were distributed during the year. Storage capacity in the State has been increased to over 600,000 bushels capacity. The Division has established a state-wide policy for the development of the sweet potato industry in the State which will steer it to a sound development with a minimum risk of failure. The cooperation of all important agencies has been secured in the execution of this policy.

A sweet potato school for county agents was conducted at Rocky Mount with a program of practical talks and demonstrations which since proved its value to the counties whose agents attended.

Counties which have become infested with the boll-weevil have been advised to grow slowly into the commercial sweet potato business while every community and town has been urged to build storage houses to supply its local demands as a strictly conservation measure.

The organization of local associations of sweet potato growers to construct storage houses and to market their potatoes has been conducted in cooperation with the Division of Markets.

Superior seed strains of the Porto Rico and Nancy Hall varieties which have been developed at the Pender Farm are being used in seed development work in cooperation with fourteen county agents. This work will supply the commercial industry with standard, high productive, disease-free seed, something that has retarded the proper development of the industry in the past.

### HOME GARDEN WORK

Of far reaching importance was the work with the home garden project in which efforts were successfully made to increase the number and quality of home and farm gardens and to emphasize the value of the "all-year"garden. Three garden bulletins were published to assist in this work. A garden specialist was secured to conduct this work. Both the county and home agents have been developing the work in their counties. Much interest in home gardening was developed as the

result of Governor Morrisons' "Live-At-Home" campaign. The garden work has been conducted with the economic, thrift, social, educational and public health phases emphasized. When it is realized that vegetables are essentially necessary in the diet if the highest mental and physical efficiency is to be maintained, and that it has been estimated that approximately 1,000,000 people in the State have their mental and physical efficiency impaired because of the lack of fresh vegetables, the vast importance of home gardens will be fully realized.

### DEMONSTRATION HOME ORCHARDS

It has been the plan of this work to plant one or more one-acre demonstration home orchards on the farm.

Demonstration orchards have been located in cooperation with the county agents and under their supervision. The plantings have been composed of varieties found by the Division of Horticulture to be most desirable for the different sections of the State.

During the last four years, nearly 150 of these orchards have been planted. A majority of the orchards have developed very satisfactorily, while a few have been decidedly unsatisfactory. The degree of success of the orchards has been in proportion to the amount of attention given them in almost every case.

These orchards are to be used by the extension workers of the Division of Horticulture for demonstration purposes so far as it may be possible.

### GENERAL TRUCK WORK

This work included work on commercial truck crops. A statistical summary shows 4 visits to agents, 5 visits to others, 4 meetings, attendance 250; 74 miles traveled by auto and 47 by rail.

During the year Mr. Frank E. McCall was appointed to the position of Garden and Home Beautification Specialist. Mr. W. W. Magill, Extension Horticulturist, resigned to accept a similar position at the Kentucky University. This position was filled by the appointment of Mr. R. F. Payne.

Respectfully submitted,

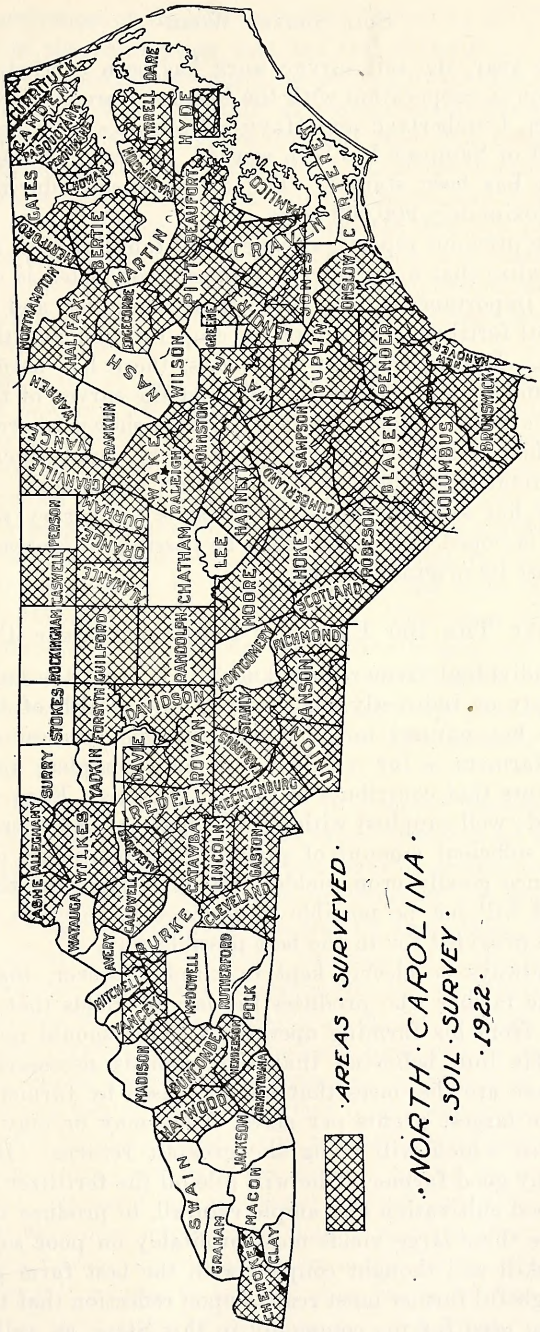
C. D. MATTHEWS, *State Horticulturist.*

# DIVISION OF AGRONOMY

The work of the Division is conducted under a joint agreement between the State College of Agriculture and Engineering and the State Department of Agriculture. In much of the work, different offices of the U. S. Department of Agriculture are cooperating, under approved plans and agreements. Although the Division has suffered somewhat under handicaps, it is felt that the work as a whole has been carried on during the year quite satisfactorily. As stated in a previous report, it is felt that the work of the Division is well founded and under favorable conditions, the results secured and given out to farmers of the State through extension activities and in other ways will be of great value. To a great extent in order to safeguard extension work always from any taint of propagandism it will be safe for extension workers to be guided very largely by the practical results and facts brought out by contract with the best farmers and by carefully thought-out and conducted field experiments dealing with the many practical problems and difficulties of North Carolina farmers.

During the year, North Carolina farmers, as never before, have been brought to a keener realization of the importance of their using the most productive and best suited seed possible to obtain for their different conditions. They, too, have been made to realize that they themselves may do much on their own farms to produce much better seed than they have been using in the past. One of the cheapest grains the farmer can get is from the planting of seed of the best suited varieties of the different crops he is growing. To show what the used of the best yielding seeds of field crops would do for North Carolina agriculture next year, based upon differences secured in our field demonstrations on farms in different parts of the State, if all our farmers should use seed of the crops indicated below, best suited to their conditions and needs, with an average good season and with average good fertilization and cultivation, the increased yields and their value from the use of better seed of the different crops over the ordinary seed commonly used should be as follows for the State:

| | *Increase from good seed* | *Price* | *Annual value* |
|---|---|---|---|
| Corn | 5,104,000 bu. | $ .75 bu. | $ 3,828,000 |
| Cotton lint | 160,000 bales | .20 lb. | 16,0000,000 |
| Cotton seed | 80,000 tons | 45.00 ton | 3,600,000 |
| Wheat | 414,000 bu. | 1.50 bu. | 621,000 |
| Rye | 118,784 bu. | 1.00 bu. | 118,784 |
| Oats | 542,091 bu | .60 bu. | 325,254 |
| Soybeans | 269,250 bu. | 1.35 bu. | 363,487 |
| | | | $24,856,525 |


AREAS · SURVEYED ·
NORTH · CAROLINA ·
SOIL · SURVEY ·
1922 ·

## SOIL SURVEY WORK

During the year, the soil survey work has been carried on actively by the Division in cooperation with the Federal Bureau of Soils. Since the last report, Cumberland and Haywood counties have been finished, about one-half of Sampson has been worked, and work in the Currituck-Camden area has been started. The areas finished during the year embrace approximately 900,000 acres.

As stated in previous reports, anyone at all familiar with agricultural work must realize that a soil survey properly conducted is on the most fundamental importance to the intelligent planning and conducting of work in soil fertility, crop adaption, crop rotation and the fertilization of crops. During the past few years, there has been a steadily growing demand for the reports and maps of the survey of the different counties of the State. Not only have farmers shown interest in these, but rural school teachers, prospective settlers, lumbermen, highway engineers, secretaries of chamber of commerce, and others.

The survey has suffered during the year a temporary reduction in its force. It is hoped that it will soon be possible to increase the force back to at least its original number.

## SOIL FERTILITY THE BIG FACTOR IN PROFITABLE CROP PRODUCTION

As every individual farmer must know, it is from the cultivation of the soil directly or indirectly that most of the wealth of the State is derived, it is but natural to infer that the one greatest outstanding need of our farmers is for a fuller and more complete knowledge of the many factors that contribute to productive soils. Even when a soil is well drained; well supplied with organic matter; and there is present in the soil a sufficient amount of plant food constituents in available form to produce goodly crop yields. Should anyone of these factors be lacking, it will not be possible to produce large crops even if all the others are provided for in the best possible way.

It should always be clearly kept in mind, however, that it is not necessarily the farmer who produces the largest yields that secures the largest profit from his farming operations. One should not be misled by large yields into believing that the methods necessarily used in producing these are the onees that must be used by farmers generally to produce the largest profits per acre. They may or may not be the ones if adopted which will bring the greatest returns. It is almost possible for any good farmer, if he will pile on the fertilizer or manure, with fairly good cultivation and ample rainfall, to produce large yields, but to produce these large yields most profitably on poor soils requires considerable skill and thought coupled with the best farm practices.

Every thoughtful farmer must realize upon reflection that the methods that have been used far too commonly in this State, as well as by farmers in other sections, have led in far too many cases to a depletion

of the productiveness of the soil instead of increasing it. This has been largely due to the assumption that the soil contains an inexhaustible supply of the materials necessary for crop growth and that the only thing that has to be done, especially if weather conditions and other factors are favorable, is to prepare the soil well and to give the crop reasonably good cultivation. This plan, although irrational, is used far too generally by our farmers in North Carolina and as a consequence our soils in far too many cases have been run down in productiveness to such an extent that it is not possible to secure, ordinarily, very large returns with the use of the best cultural methods and most favorable weather conditions, as is shown by the small average yields of crops per acre for the State.

It has been found in our investigations, covering a good many years, that most of our soils are deficient in one or more plant-food constituents. These deficiencies, of course, must be met if reasonably large crop yields are to be secured. It matters not how abundantly the soil might be supplied with phosphoric acid and potash, if the supply of nitrogen is only present in the soil in available form in a sufficient amount to produce, say, 15 bushels of corn per acre, this is the very largest yield that could possibly be produced under the most favorable conditions until the deficiency has been met. The same might be said, too, with reference to phosphoric acid. If nitrogen and potash were present in sufficient quantities to produce 100 bushels and the phosphoric acid in available form during the season only present in sufficient amount to produce 10 bushels, this would be the maximum amount that could possibly be secured.

It should be remembered, too, that it is never possible under any circumstances to feed to livestock only crops produced on the farm and have them prove an agency in increasing the productiveness of the soils of the whole farm. Of course, if livestock are kept and feeds are bought in large amounts and the manure from them is saved carefully and applied back on the farm the buying of the feeds in large amounts should be the means of increasing the productiveness of the soil. This is not the condition, however, on the average farm of the State where the farmer feeds only the feeds produced on the farm. For instance, if a ton of cowpea vines, soybeans, or clovers is produced on the farm, cut and fed, not more than half of the plant-food constituents contained in the hay would ordinarily find their way back into the soil on the average farm, and in many cases it would be less than this. Not only this, but carefully conducted feeding experiments in North Carolina and elsewhere have shown that it requires about 2½ tons of ordinary dried hay on an average after being fed to supply the same amount of organic matter to the soil that would be contained in the original tons of these crops before being fed, and which would go back into the soil where they are plowed into the soil. It is not practical,

nor is it advised that all of the leguminous crop should be used after growth for soil improving purposes, but some of them should be.

The practical bearing of these facts is that there is a constant loss of plant-food constituents from the soil when crops are handled in this way or are sold from the farm unless it is seen to that the plant-food removed is replaced by the purchase of plant-foods from the outside, and there a marked decrease in the organic matter and plant food supply of the soils, and they will be run down in productiveness.

One must realize, who is at all conversant with the soils of the State, that one of the great deficiencies of our soils is not only plant-food of one kind or another, but organic matter. It should not be inferred, however, from the above that it is not considered wise to raise and feed some of these crops to livestock. The point it is wished to emphasize is that in order to maintain our soils in a productive state, it should be so planned by our farmers so to handle their soils and crops after growth so as to keep them well supplied with organic matter and to have them contain for crops a sufficient amount of balanced plant-food constituents so that crops grown on the land will not suffer for lack of any plant-food constituents, but will have sufficient for goodly yields.

We have never been more thoroughly impressed with the importance of soil fertility than recently by answers to a questionaire sent out to a large number of leading farmers, county agents, etc., with reference to the main defects of present agriculture. A vast majority of the replies that have been received indicate that farmers fully appreciate that the most important matters to be looked after by the farming industry of the State is that of maintaining and increasing the productiveness of the soils by a systematic system of crop rotation in which legumes are grown and part of which will each year find their way back into the soil, and by looking after other factors that are closely associated and essential to a fertile soil. No intelligent person, it seems to us can be confused in the matter of high acreage production and big crops in the aggregate. It is a well known fact that the vast majority of the most prosperous farmers in every community, where they are dependent upon the returns received from crop yields, are those who are getting at least moderately good yields per acre. No one can hope to make very much profit in farming, if any at all, where the yields are small. The unit cost of production will be too great.

Every farmer should plan to put in a certain acreage to at least one of the leguminous crops that is suitable for growth in his particular section and after growth plan to have at least a portion of the crop, after harvesting as least some of the seed, go back into the soil to provide the soil with more organic matter and to cheaply replenish the nitrogen supply of his soil. Legumes, of course, are the only crops which when grown properly will add plant-food to the soil, which they take from the air, other than what they themselves took from it. Of course, other crops like rye will add organic matter as do the legumes

also. If the soil is very poor, rye is one of the best crops for a year or two until its organic matter supply has been built up. After which one or more of the legumes may be safely seeded with assurance of success.

## SOIL FERTILITY FIELD WORK

Soil fertility investigations are being made by the Division of Agronomy at the following experimental farms:

Central Branch Station Farm at Raleigh.
Buncombe Branch Farm at Swannanoa.
Iredell Branch Farm at Statesville.
Edgecombe Branch Farm at Rocky Mount.
Washington Branch Farm at Wenona.
Pender Branch Farm at Willard
Granville Branch Farm at Oxford.

## AT BUNCOMBE FARM

*Field A.*—An experiment is being conducted on Field A to determine the correct amount of nitrogen, phosphoric acid, potash and lime to apply on the crops grown in a rotation of corn, wheat and red clover. This expeeriment is being continued, and the results so far secured indicate that phosphoric acid, nitrogen and lime are all needed to produce large crops, with phosphoric acid the first plant-food requirement. Lime used on red clover gives large gains, and when the clover is turned into the soil it furnishes a part of the nitrogen needed for larger crop yields.

*Field D.*—The experiment on this field is designed to show the relative value of acid phosphate and finely ground rock phosphate as carriers of phosphoric acid for crops grown on the Mountain Valley soils when used alone, with cover crops, and with manure. In this experiment, the rotation of crops consists of corn, oats, wheat and red clover. The results so far show that acid phosphate is a more economical carrier of phosphoric acid than is rock phosphate used on this soil. The fact is borne out when the two carriers are used with nitrogen and potash; with stable manure, and with legumes turned into the soil.

*Field D* (Continuous Corn with Crimson Clover and Phosphates)—In this experiment, corn is grown every year and crimson clover is sown each fall and turned under in the spring. The experiment is designed to show the relative value of acid phosphate and rock phosphate used under corn when a cover crop is turned under each year. Also, if sufficient nitrogen from the air can be secured by the legumes in the rotation to maintain large crops of corn. The results so far indicate that acid phosphate is the most efficient carrier of phosphoric acid when compared with rock phosphate. This holds true until the amount of rock phosphate used is about four times that of acid

phosphate. Under the latter conditions, the rock phosphate treated plats are giving somewhat larger yields of corn. The experiment has been running, now, eleven years, and the residual effect of the phosphates are beginning to show up.

*Field F.*—On this field, the experiment is being conducted to study the best fertilizer to use in a rotation consisting of Irish potatoes, corn, wheat and red clover. Different amounts of nitrogen, phosphoric acid and potash are used, in order to determine the best fertilizer formulas. Also, muriate of potash, sulphate of potash and kainit were used comparatively as sources of potash.

The different sources of potash have not materially differently influenced the yield of Irish potatoes. The normal fertilizer used for potatoes was 800 pounds of an 8-4-6. This amount seems to pay better than when the different plant food materials were increased in amount. The use of lime is showing up to advantage with the red clover.

*Field B* (Rotation).—This field is planned and used to study the effect of growing crops continuously; in a two-year rotation and a three-year rotation with fertilizer. One end of this field has been limed, to study the effect of liming with the different crop rotations. Continuous corn has shown to be nearly as good as when a rotation of corn and wheat is used; but the yield of wheat was nearly twice as good with the two-year rotation. Legumes in the two-year rotation have given increased yields of both corn and wheat. With a three-year rotation, when red clover was used, the yield of both corn and wheat was greatly increased. The uses of lime and phosphates have increased materially the yield of all the crops.

*Field G.*—This experiment is being made to compare phosphatic materials with a complete fertilizer; with limestone, and with stable manure. The results so far secured indicate that limestone and manure with fertilizers give better results than when fertilizer is used alone. Acid phosphate has proven better than rock phosphate, except when large quantities of the latter are applied. Basic slag is showing up fine, especially on the unlimed plats.

### AT IREDELL FARM

*Fields A, B and C.*—Fields A, B and C of this farm are used to determine the most profitable formulas and right amount of fertilizers to use with each crop, with and without lime, with a rotation of crops consisting of cotton, corn, wheat and red clover. In this experiment, acid phosphate, rock phosphate and basic slag are compared as carriers of phosphoric acid, used with and without manure. In these regular fertilizer experiments, the results are quite conclusive in showing that phosphoric acid, nitrogen and lime in some available form are essential for larger and more profitable crop yields. It has been found that, up to a certain limit, increasing the amounts of the plant food materials has given increased yields. From observations

made while doing extension work, it was found that farmers are not using enough of any of these materials for best results. Increasing the amounts of potash has not, however, generally resulted in much gain in yield.

*Field D* (Rotation).—This experiment is designed to work out the same general results for the Cecil clay soil as is indicated as being done for the Toxaway soil of Field D at the Buncombe Farm.

A comparison of continuous cropping and the same crops in a two-year rotation has given about the same results. When legumes are used in the two-year rotation, better results are secured; and when the rotation is broadened and red clover is used for one year out of three, increased yields are the result. With the addition of limestone, the legumes make a much more satisfactory growth.

*Field F* (Different Nitrogenous Materials).—This experiment was started to compare some commonly used nitrogenous materials that are being used by fertilizer companies in making different fertilizer mixtures. In studying different carriers of nitrogenous materials under cotton and corn, the efficiency of the materials tried, when measured by crop yields, have been as follows: First, nitrate of soda; second, nitrate of ammonia; third, sulphate of ammonia; fourth cottonseed meal; fifth, calcium cyanamid, and sixth, sewage sludge. These results are in accord with other results secured during a long period of years.

*Field G.*—This experiment is designed to show the relative value for the soils of this farm, of acid phosphate and different amounts of rock phosphate, beginning with 500 pounds of rock phosphate to the acre once in every three years and going up as high as 3000 pounds per acre once in every three years. The crops used on this field are corn, wheat and red clover.

In comparing acid phosphate with rock phosphate in different amounts, acid phosphate has given greater efficiency, except when 3,000 and 4,000 pounds of rock phosphate per acre were used every three years, broadcast. From these results, it is believed that if farmers wish to use rock phosphate, it should be applied in large quantities at stated intervals in order to furnish enough available phosphoric acid to the crops the first year.

*Field K* (Soft Phosphate).—This field is used to study the comparative value for increasing crop yields of acid phosphate and soft phosphate rock used on corn, cotton and wheat. Studying the results with acid phosphate and soft rock phosphate with corn, cotton and wheat, they are very positively in favor of acid phosphate. When the amount of soft rock phosphate was doubled the yields were not increased.

It has been noted by the superintendent of the Iredell farm the marked improvement of the texture of the soils of the experimental plats to which lime has been added, as is evidenced by the portion washing less and plowing better than where no lime has been added.

*Logan Field.*—This field is used to study the comparative value of burnt lime, hydrated lime and ground limestone, used in amounts varying from one, two to three tons per acre, applied every four years in a rotation consisting of velvet beans, rye, cotton, cowpeas, oats, vetch, red clover and crimson clover. In this test, acid phosphate is added in sufficient amounts for larger crops and the rotation is designed to furnish enough nitrogen for large crops.

The results from this field are inconclusive at the present time, especially as to the right amount and form of lime to use. So far, with the rotations used, enough nitrogen has been gathered by the legumes grown in the rotations to supply the non-leguminous crops with nitrogen to make very good yields. It is hoped that this experiment will show the value of long rotations, including the legumes, and in the cutting down of fertilizer bills.

### AT EDGECOMBE FARM

This year, the only experiment carried on at this farm was a continuation of the rotation experiment (Field D) designed similarly to the one being conducted at the Iredell and Buncombe farms.

The main fertilizer experiments were discontinued during the year. These have in the past shown the need of the soil for nitrogen and potash for larger crop yields. Still larger gains were made when nitrogen and potash applications were increased two and three times normal amounts. The use of phosphoric acid has shown good results, especially when moderately good applications of nitrogen and potash have been made. Lime has shown to good advantage and can be recommended for use in any good crop rotation scheme. From the results, it is evident that farmers might use, especially for cotton, larger quantities of fertilizer per acre. They might increase the amount from 400 to 500 pounds to 700 or 800 or more per acre for best paying results, when cotton is selling at a reasonable price.

From the results on Field D, the practice of growing either cotton or corn continuously in the same field is to be discouraged.

When summer or winter legumes are used in rotation with cotton and corn crops, yields have been increased some, and when a three-year rotation is used, even greater yields are secured. It will be possible, it appears, by the use of legumes in a longer rotation, to cut down fertilizer bills to some extent.

### AT PENDER FARM

*Field A.*—This field is being used for an experiment to work out the best fertilizer formulas of fertilizer to use for cotton, corn, oats and vetch in a three-year rotation in which summer or winter legumes are used every year. One-half of this field is limed once every three years, to study the relative effects of *lime* against *no lime* on the growing

of legumes for building up the productiveness of the soil and on the efficiency of the different fertilizer treatments.

The results so far secured indicate the value of the use of more nitrogen and acid phosphate on this soil, for both cotton and corn, than is commonly used. When nitrogen was added in large quantities, larger crops were secured. The use of lime has given very good results and its use broadcast every three or four years, with a rotation including oats and vetch and soy beans, is recommended.

*Field B.*—In this experiment, a study is being made of the relative efficiency of different carriers of phosphate with and without lime. The rotation is the same as is being used on Field A. Acid phosphate has shown greater efficiency than either phosphate rock, soft phosphate or basic slag on this type of soil, as measured by the increase in crop yields from a unit application of phosphoric acid.

*Field E.*—This is an experiment which is designed to determine the plant food deficiencies of the soils occurring in that section of the State. Results show that this type of soil is in need of nitrogen and potash for greater crop yields. When both of these are used, phosphoric acid aids in making larger yields of crops. The use of lime has been found to give good results with leguminous crops.

The attention of visiting farmers has been shown the decidedly good effects of the use of lime, the disastrous effects of using no fertilizer and the poor economy of using heavy applications of fertilizers without the use of lime and the growing and turning under of organic matter.

### At Washington Farm

*Field A.*—The experiment at this farm consists of a study of different fertilizer applications for corn, oats and Irish potatoes. No fertilizer combination used has given any practical increase in crop yields, while the use of lime gave a decided increase. Thus far, corn has been the only crop grown successfully. The field has now been divided across the plats into three one-acre plats, which will be used for corn, for oats and soy beans, and for Irish potatoes every year. Only one year's results have been secured from the residual effects of fertilizers and lime previously added to the different plats.

*Lime Field.*—In this experiment, burnt lime, marl and ground limestone are compared, using one, two, three and four tons per acre of each. Fertilizer is used on plats with the different amounts of ground limestone, to determine if fertilizer will pay on this soil. The results thus far secured show that between two and three tons of lime are needed on these peat soils for the best results with corn, when the lime is applied once every three years. A complete fertilizer with limestone has not given any crop increase over the use of ground limestone alone used at the rate of one, two, three and four tons per acre, broadcast.

Marl has not given as good returns as either hydrated lime or ground limestone.

*Cultural Experiments.*—In these experiments, different crops are used with the land disked four inches; plowed eight inches and rolled, and plowed twelve inches and ridged. Results so far secured indicate that ridge culture and disking four inches deep are best for corn and soy beans on this kind of soil. With small grain crops, rolling seems to be an advantage. Stable manure has given good results, but causes crab grass to grow and give a lot of trouble.

*Grass Plats.*—This experiment consists of fifteen plats with the different mixtures of grasses that were thought to be of value for pasturage and hay in that section of the State.

### MISCELLANEOUS EXPERIMENTS

To study the effect of cowpeas on the yield of crops an experiment is being conducted on Alamance silt loam, in Anson County. The cowpeas are being grown and turned under with and without lime. This experiment was started to check up the prevailing local opinion that the yield of crops was decreased when a crop of cowpeas is turned previously into the land. The plowing under of cowpeas on this type of soil has been found to give beneficial results, which is contrary to local opinion where these soils occur; but it is in harmony with the idea that organic matter from cowpeas is beneficial in the soil, to future crops.

In the study of the use of gypsum on peanuts, on the farm of B. B. Everett, Palmyra, it was found last year that where this material was applied to peanuts it gave an increase in the crop yield of more than enough to pay for the material and the expense of making the application.

In a study made of the plant food needs of Ruston sandy loam soil, in Cumberland County, in cooperation with the Federal Bureau of Plant Industry, it was found that all plant-food ingredients are needed for best results with cotton. The results, too, indicate that best returns come from the use of about 900 pounds per acre of a fertilizer analyzing about 8 to 10 per cent phosphoric acid, 5 per cent ammonia and 4 per cent potash.

In coöperation with the Bureau of Plant Industry, some coöperative work, too, has been carried on on the Georgeville sandy loam type of soil in Randolph County. The results thus far indicate very strongly that phosphoric acid and nitrogen are at present the main limiting plant food factors for large crop yields. Potash used alone seems to give about the same or less than no fertilizer treatment. This is in accordance with previous results on heavy soils of the Piedmont section of the State.

Results from cooperative fertilizer work with the Bureau, on cotton in Craven County on the Portsmouth sandy loam type of soil, have

shown that the use of phosphoric acid and nitrogen gave best results. Potash has shown some gains after phosphoric acid and ammonia are applied. Under cotton boll-weevil conditions, it is advised, for soils in average condition, to increase the phosphates in fertilizer mixtures for cotton for these soils, to at least 12 per cent, and use with it about 5 per cent ammonia and 3 per cent potash.

In the fertilizer experiment at Wilkinson, on Portsmouth fine sandy loam soil, an application of fertilizer has not shown very much increase over the untreated plats. With cotton, basic slag and finely ground rock phosphate have given some increase in yield. Phosphates alone have not given very much increase over the no-treatment plats.

## NEW SOIL EXPERIMENTS

New experiments have been started in cotton-variety fertilizer studies on Norfolk sandy loam near Whiteville, and on Portsmouth fine sandy loam near Edenton; also fertilizer experiments to determine the best fertilizer formulas for cotton grown on Norfolk sandy loam at Salemburg; on Marlboro fine sandy loam at Roseboro, and on Norfolk sandy loam at Speed.

A study of the effect of potash, too, on the yield of corn and cotton grown on Alamance silt loam at Monroe has been started.

*Some General Deductions from Field Soil Fertility Investigations for Mountain Soils.*—It has been found that phosphoric acid, nitrogen and lime are the main controlling plant food factors in the growth of more profitable crops on mountain soils. This includes both bottom and uplands. Organic matter incorporated in these soils has been found to increase crop yields materially.

Acid phosphate is the most efficient carrier of phosphoric acid with general field crops; with legumes and grasses, basic slag has been found, also, to be an efficient source of phosphoric acid.

In any scheme of crop rotation adopted there should be included both annual and perennial legumes. Soy beans for the annual, and red clover for the longer growing periods, fit in and do well in this section of the State.

*For Piedmont Soils*—Phosphoric acid and nitrogen have to be supplied for the most profitable growth of crops on these soils. Potash is not nearly so essential. Longer crop rotations than are usually used, including more legumes, are needed. Organic matter is very essential for most of the heavy soils of this section. Lime is very beneficial, especially when legumes are grown. Acid phosphate is the most economical carrier of phosphoric acid, and nitrate of soda and sulphate of ammonia are the best and most efficient carriers of nitrogen. Cottonseed meal is one of the best carriers of nitrogen in the organic class. In any pasture mixture of grasses, orchard, redtop and red clover should be used for best results.

*For Coastal Plain Soils.*—Our results are conclusive in showing the need, generally, with most soils of this section of nitrogen and potash for larger and more profitable crop production. Lime and organic matter are very beneficial on these soils and greatly increase the efficiency of fertilizers applied to the crops. Acid phosphate gives better returns than do other carriers of phosphoric acid tried out. Nitrate of soda and sulphate of ammonia stand out as the most efficient carriers of nitrogen. Cottonseed meal is one of the best organic carriers of nitrogen for Coastal Plain soils. On an average, larger amounts of fertilizers could be used with profit for cotton on these soils than is usually used, provided the right kinds are used and the crop is properly cultivated.

*For Muck and Peat Soils.*—Lime is very essential for profitable crop production on these soils, after proper drainage has been established. Two tons of ground limestone, broadcast, to the acre every three years seems to be about the correct amount to apply. Burnt lime is about as good as limestone, and both have been found to give better results that has the use of marl. This may be partially explained by the fact that the marl applied was much coarser than the other liming materials applied. Native grasses are choked out by crab grass when stable manure is applied to these soils. Planting and cultivating on a ridge has given crop increases over what was secured by disking shallow and planting flat. Better crop rotations should be established in this section of the State than is generally being used, on account of the destructiveness of crop diseases and insects.

## PUBLICATIONS

A bulletin on "The Results of Fertilizer Experiments with Corn on Mountain Soils" has been submitted for publication. Bulletins on the "Relative Efficiency of Different Nitrogenous Materials Used on North Carolina Soils," "Value of Lime on Peaty Soils" and "Results of Fertilizer Experiments with Wheat Grown on Piedmont Soils" will soon be ready for the printer.

## FIELD WORK IN SOIL SURVEY

There were found 40 different types of soil in Cumberland County, 17 in Cherokee and 8 in Haywood. Typical samples were taken for chemical analyses of all these types, including the subsoil. Cumberland has both Piedmont and Coastal Plain soils, which accounts for the large number of soil types found in that county.

Over 60 per cent of the soil area of the State has now been surveyed, and it seems very desirable that the whole area of the State should be finished in the next few years.

## WORK IN SOIL CHEMISTRY

After remaining vacant for several years, L. G. Willis has been appointed to fill the position of Soil Chemist, succeeding Dr. Plummer. In carrying out the soil fertility investigations, it is necessary for the Soil Chemist to work out many problems in order to reinforce and interpret the field results on crops and fertilizers.

Two problems are now being started, as follows:

A study will be made of the effect of different soil treatments on the availability of the potash in the common soil-forming minerals. This will comprise pot culture tests with muscovite and biotite micas and feldspar; othorclase and microcline, the common soil-forming potash minerals of the State, using rye and wheat as winter crops and soy beans and cowpeas as summer crops. The influence of the fineness of division of minerals on the availability of their potassic constituents, will be determined, as well as the effect of lime, organic matter and the nature and amounts added of different nitrogenous fertilizers. The results are expected to show whether or not the petrographic anaylses of a soil can be relied upon to indicate the probable needs of the soil for potash under different cultural practices.

Experiments have been started, too, to determine the cause of unsatisfactory yields on the muck soils of the eastern section of the State. This work will be developed as a study of the nature of the acidity of these soils, and methods will, if possible, be devised for the elimination of toxic compounds present in them.

## EXPERIMENTAL WORK WITH TOBACCO

For the past few years quite a large amount of experimental work is being conducted at Oxford under the immediate direction of E. G. Moss, and at Reidsville, with E. H. Mathewson in charge. This work is being carried on in coöperation with the Office of Tobacco Investigations of the U. S. Department of Agriculture. Below is given a brief resume of some of the more outstanding results:

### AT OXFORD

*Main Fertilizer Experiments.*—There are 36 fertilizer plats in this experiment, on which are being tested out the different sources of nitrogen, phosphoric acid and potash. On half of each of these plats dolomitic limestone has been broadcasted at the rate of one ton per acre. Results thus far secured show dolomitic limestone has increased the yield on all the plats, that there was less leaf spot trouble on the limed end than on the unlimed end of plats, and that the limestone did not depreciate the value of the tobacco; while previous experiments with the use of ground calcite showed the calcite did darken the tobacco. For that reason, we would not recommend the average ground limestone for tobacco, but do not hesitate to recommend dolomitic limestone where magnesium carbonate runs as high as 25 per cent.

*Special Potash Field Work.*—The special potash experiment consists of 20 plats on which are used different amounts of sulphate and muriate of potash, with and without ground limestone. The nitrogen and phosphoric acid under these plats remain constant, and the potash varies from 12, 24, 36 to 80 pounds of actual potash per acre derived from sulphate and muriate of potash. Results show that 36 to 40 pounds of actual potash per acre is apparently about the right quantity to use for best results on the type of soil mapped as the Durham sandy loam. The muriate of potash gives an increased yield over the sulphate of potash, but does not improve the burning quality.

*Magnesium and Potash Experiments.*—This consists of 18 plats on which are used Trona muriate, German muriate, Nebraska sulphate, German sulphate, double manure salts, and kainit. On one series of plats is applied dolomitic limestone at the rate of 1,000 pounds per acre in the drill at the time of applying the fertilizer. On the other series is used ground limestone derived from calcite. On the third series no lime was applied. Results show that on these plats where dolomitic limestone was applied no "sand drown" was present, and both yield and quality of tobacco were improved. On plats where calcite was applied "sand drown" and leaf spot were serious on all plats except where double manure salts and kainit were used. On the series where no lime was applied both "sand drown" and leaf spot were serious except where double manure salts and kainit were applied, and the yield of tobacco was 35 to 40 per cent less than on the other two series of plats.

*Special Fertilizer Tests.*—These consist of 12 plats on which were used C.P. fertilizer materials, testing out the effects of magnesium sulphate as compared with magnesium chloride; also studying the effects of sodium chloride and sodium sulphate, and potassium nitrate as compared with dicalcium phosphate. The results in these tests have not been ascertained yet, as this was the first year this series of plats was run.

*Variety Tests.*—We are continuing our work with the different varieties of tobacco, which has been carried on for the past several years. We have begun to do some breeding work and selections. The breeding consists of crossing a variety which cures bright and makes big growth and poor body and texture on to a variety which has body and weight but does not cure out as well as some of the others, with the hope of getting a combination which will make a better tobacco than we have at present. It is felt we are getting some very satisfactory results along this line.

*Rotation Experiments.*—We are trying out several rotations of two, three and four years' duration. The one that gives, perhaps, the most satisfactory results is the three-year rotation, which consists of tobacco, first year; oats, second year, followed by cowpeas or soy beans for hay

or to be plowed under as conditions may justify; Abruzzi rye for seed, the third year. After the rye, the stubble land is to be plowed deep in the fall of the year, to be planted to tobacco the following season. On farms where tobacco land is limited and a short rotation is desired, this seems to be one of the most satisfactory rotations that could be suggested. Our results thus far have shown that where such a rotation is followed, the tobacco crop shows improvement both in yield and in quality.

*Tobacco After Cowpeas.*—This experiment has been running for ten years, using cowpeas or soy beans to provide nitrogen, with a liberal application of phosphoric acid and potash supplied, but no nitrogen is applied, of a commercial form. Where tobacco is planted fairly thick in the drill and is harvested by priming, provided it is not topped too low, a crop of tobacco of average quality is produced. There are four crops grown on this land, tobacco followed by oats, oats followed by cowpeas or soy beans plowed under, and land seeded to rye to be plowed under in the spring. This is a two-year rotation; however, we do not recommend such a rotation to be followed indiscriminately, as many farmers would undoubtedly get in trouble and produce tobacco of poor quality; but it could be used with satisfactory results if followed very intelligently.

*Permanent Tobacco Seed Bed.*—A permanent seed bed can be established at a convenient location on the farm, provided it is thoroughly sterilized from year to year with steam. Such a seed bed, when once established, will grow healthy plants more consistently than a seed bed located at different places. The only handicap to this plan is the scarcity of portable steam boilers on tobacco farms.

### At Reidsville

The work being carried on at Reidsville is planned similarly to that being conducted at Oxford. The results there, as at Oxford, were quite striking in showing the marked influence of the use of magnesia in overcoming entirely or greatly reducing the ravages of "sand drown." It is regretted to have to report that late in the year the work at this farm sustained a great loss in the losing of Mr. Mathewson from the work, to take up work in the Orient with a big commercial tobacco company.

## Experimental Work in Crop Improvement

### Adams Projects

*Project No. 14.*—The cotton study of association and inheritance of economic qualities has been continued. This work has consisted of preparation of data and notes for publication and further study of certain smooth-seeded types that were not included in the plantings during the past three years, on account of the lack of space. Due to

old seed and unfavorable spring weather, a very poor stand was secured in the plantings of this season. Sufficient seeds were saved to continue the strains. The results from this project are being put in shape, and it is hoped to publish them, with the deductions, some time during the coming year.

*Project No. 15.*—The "place effect" study of cotton conducted in cooperation with the Mississippi Experiment Station has been continued. The unfavorable weather in the spring destroyed so many seedlings that a fair comparison of the two sources of seed was rendered impossible, on account of the irregular stand. It is planned to continue this work for another year.

*At Central Farm.*—The field crop work at the Central Station farm has consisted of trials with new crops, seed selections and cultural studies. In the trial plats were included the subterranean clover, seredella, Vicia dispeania, Japan clover (Tennessee strain No. 76), three new varieties of cotton, four new varieties of soy beans and two strains of the annual sweet clover. The subterranean clover is a Bureau of Plant Industry introduction from Australia, and has given very promising results. Judging from its growth, earliness of seeding in spring and resistance to drought, it will be superior to burr clover for soil improvement and for grazing. The young seedlings which volunteered on the plats in the summer withstood the dry, hot weather of August and September. This crop is being tried this fall on a larger scale here and in another section of the State. The narrow leaf vetch (Vicia disperma) has continued to show more resistance to the false anthracnose, that has been very destructive to ordinary hairy vetch. Seed of the Japan clover, strain No. 76, from the Tennessee Experiment Station, was grown in comparison with ordinary commercial seed. The Tennessee strain has been found to be more upright in growth and much superior in quantity of growth.

Of the new strains of cotton grown for the first time on this farm, Delfos, from the Mississippi Station, has given the best results.

The seed improvement work includes plant-to-row and increase plats of cotton, corn, soy beans, wheat, rye and sorghum. On this farm, all of the cotton breeding work is confined to strain No. 6 of Mexican Big Boll. It has continued to gain favor in the State on account of its large yield and extra length of staple. In the plant-to-row plats, a large portion of the rows furnished 1⅛-inch staple and have been unusually productive. The corn breeding work has been continued with the strain of Coke's Prolific that has been grown on the farm several years. No other seed improvement work of the Division of Agronomy has yielded better returns than the soy bean work. Three pedigreed strains of Virginia, three of Haberlandt, and eight of Mammoth Yellow soy beans were increased and compared with the varieties from which they came. The best strains of these varieties

have been distributed to the branch station farms and to private growers of the State, where they are being increased. Haberlandt No. 38 and Virginia No. 11 have shown up well in community tests throughout the Piedmont section. The selection of Mammoth Yellow for higher oil content has been continued.

Some interesting results have been secured from a chance hybrid between the Haberlandt No. 38 and Virginia soy beans. Some F3 plants were grown this year. In the lot was considerable variety of types, ranging between the two parent varieties. One of the most promising selections from the F3 material is the progeny of one plant, all of which are of the Virginia type of growth, having yellow seed instead of brown. The main stems are stiffer than the original Virginia, furnishing a more upright plant at the time of harvest.

Strain No. 12 of Leap's Prolific wheat has been continued, though the 1922 crop was not offered for sale on account of the mixture of volunteer oats and rye in it. Seed of it has been recleaned by hand, for further increase this fall. Through the variety studies on this and other farms, it was found that the earlier North Carolina wheats are more productive on the average North Carolina soil. Our average yield for the State, of approximately eight bushels of wheat per acre, indicates that a large portion of our wheat is grown on land low in fertility. The variety tests made upon soils which produced 15 to 20 bushels per acre have been misleading, when the average conditions of our State are considered. The tests on soils producing 8 to 10 bushels per acre have shown conclusively the need for an early maturing variety of wheat. To meet this need, the Division of Agronomy has started work on the selection and increase of an early variety known as Alabama Blue Stem. This variety is an early strain of Purple Straw, which has given splendid results in field trials during the past three years. The strain was secured originally from the Alabama Experiment Station. The pedigreed strain of Abruzzi rye was increased on a larger scale. Several plant selections were made for the plant-to-row comparison and increase. Three hundred bushels of this strain were sold to growers of the State, to be grown for seed purposes.

On account of the high production of the Honey or Japanese Seeded Ribbon sorghum in the variety tests, work has been started in the selection and increase of seed of this variety. Plant selections have been made and are being examined for juice and sugar content.

The field crop culture work has constisted of cotton spacing tests, in which distances between hills were as follows: "No thinning," 8, 12, 18 and 24 inches in 4-foot rows. The unthinned plats have continued to yield highest, and in each of the other plats the thicker spacing has yielded more than the thinner spacing.

*Hay Mixtures.*—Small broadcast seedings of different varieties of cowpeas, soy beans and sorghum were planted, to determine the varie-

ties which matured nearest the same time and were best suited for hay mixtures. Data was secured upon the habit of growth and time of maturing of five varieties of sorghum, seven varieties of cowpeas and six varieties of soy beans.

*At Mountain Branch Farm.*—The work at the Mountain Branch Farm has consisted of seed selection with corn and soy beans, and variety tests of wheat, oats, rye and soy beans. The plant-to-row breeding of Biggs' corn has been continued, with encouraging results. This branch station has become a source of good seed in that section of the State, and its seed are likely to become more popular on account of the recent standing of this corn in community variety tests of that section of the State. The increase of Haberlandt No. 38 soy beans at this farm has been more successful this summer, on account of the longer season between frosts. In order to insure its maturity in that section, a large number of plants were selected this fall.

*At Piedmont Branch Station.*—The field crop work of this farm consists of cultural studies of wheat and oats, and improvement work with cotton, corn, wheat, oats and Abruzzi rye. The past season completed a six-year test of rate and date of seeding wheat and oats. The results of this test are being prepared for publication. The pedigreed strains of cotton, wheat, oats and rye are being increased for sale to growers of that section.

*At Tobacco Branch Station.*—The Tobacco Branch Station has been used for the increase of an early strain of Purple Straw wheat, Abruzzi rye and seed corn.

*At Edgecombe Branch Station.*—At the Edgecombe farm, seed improvement work with Mexican Big Boll cotton and Biggs' corn has been continued. The Mexican cotton has been isolated down to one pedigreed strain, No. 18. This strain has less vegetative growth than the original strain and has proven more productive. The staple is 1 1-16 inches and its yield has been equal to that of Cleveland Big Boll, our highest yielding short staple cotton. The corn work at this farm has been delayed by the introduction of two new varieties last spring. The number of varieties will be reduced to one, and new selection will be made this fall. Two hundred bushels of improved cotton seed were sold from this farm last season, and 1,200 bushels will be offered this season.

*Pender Branch Station.*—The work at this farm has consisted of seed improvement of Cleveland Big Boll cotton and the increase of two pedigreed strains of soy beans from the Central Station farm.

*At Blackland Branch Station.*—At the Blackland farm, work has been continued on the improvement of Latham's Double corn for that section. Special attention is being given to the selection of seed which will give a firmer corn, shorter shanks, better shucks covering and

higher yield. The seed plats of this season have some very promising strains.

### Extension Field Work in Soils and Crops

The main problem being attacked in this work is the improvement of the soils of North Carolina. Nine-tenths of the farm revenue of North Carolina is derived from crops. Crops, livestock, and the farmers' prosperity in general, are more dependent upon the soil than on any other one thing. We are recommending organic matter as the one greatest need of our soils. A sufficient quantity of this material can be secured only through suitable crops and crop residues, for the State produces a relatively small number of livestock in proportion to the land in cultivation. Legumes are considered the best crops for this purpose, because they can utilize nitrogen from the air. The taking off of any crop, even a legume crop, does not improve the soil, but injures it to some extent. Therefore, we recommend that some suitable crop be turned under to supply organic matter and plant-food to the soil. Systematic rotation will facilitate soil improvement in this manner.

Diversification of crops goes hand in hand with soil improvement and the practice of rotations. This fact has been emphasized. With some soils lime is of direct benefit to all crops. On many more it benefits legumes directly, and when the legumes are plowed in, the soil is enriched for succeeding crops.

Fertilizers should be used to increase crop yields in a soil building rotation. We have considerable information about the proper use of fertilizers in all parts of North Carolina. The home mixing of fertilizers is often a paying practice. Fertilizers and lime have received attention at nearly all meetings and farms visited this year.

Improved seed is important in making more and better crops. Some field meetings to discuss this subject have been held.

At present, there is great interest in permanent pastures in the State. Considerable instruction has been given in starting and caring for them.

So far as possible, the work has been made to fit the season. It must be realized, however, that the territory to be covered is large, and that such subjects as soil improvement and crop rotations are year-round subjects in their nature, and may be discussed with propriety at any time.

The work has been done almost entirely in coöperation with county agents, with agricultural high schools and with fairs. The methods used were personal visits to farms, indoor meetings, field meetings, field demonstrations, and exhibits at county fairs. The following thirty counties have been visited during the year: Alamance, Alexander, Beaufort, Buncombe, Carteret, Caswell, Cumberland, Currituck, Duplin, Durham, Hertford, Iredell, Jones, Lenoir, New Hanover, Northampton, Onslow, Pasquotank, Perquimans, Pitt, Richmond,

Robeson, Sampson, Scotland, Stanly, Tyrrell, Union, Vance, Wake, and Wilson.

About three hundred farms have been visited. Advice on various agronomy problems were given at each one. Usually, from three to five subjects were taken up at each farm. Most farms visited were in the same counties where other work was being done, the visits being made between meetings.

Fifty-seven indoor farmers' meetings were held mainly in the winter and late summer, after crops had been "laid by." It is almost impossible to hold such a meeting during the busy season of farmers. The average attendance at meetings was 20, an increase over last year. At most meetings farmers showed their interest by asking questions for fifteen minutes to one hour after the speaker had finished. Some of the smaller meetings were the best, because farmers always feel free to ask more questions at a small meeting than they do at a large one. This increases the benefit to all those present. The attendance at meetings varied considerably, depending on how thickly the community was settled, whether there were any other attractions in reach at that particular time, the weather, the condition of the roads, and, most of all, on how well the county agents had advertised the meetings.

The field meetings were very similar to the indoor meetings. They were held on farms where there was something of interest to show in the way of growing crops. Naturally, they occurred at a different time of year from the indoor meetings. The total attendance at all meetings was 1,467.

It is well known that an actual field demonstration is one of the best means of teaching an agricultural truth. Last spring we started 34 simple demonstrations to show the value of using lime in growing legumes and of turning under a leguminous crop for soil improvement. Four such demonstrations were continued from 1921. The plan most followed is to lime half of a field and to grow a summer legume the first year, followed by a winter cover crop. These two crops are removed on half of the limed part and on half of the unlimed part of the field, the rest is turned under. Corn is to be grown the second year. Another plan is to compare the effect of the taking off or turning under of crimson clover upon corn, following the clover. A plat on which the clover has been grown is included if possible. On a demonstration of this sort in Jones County, as a type, the following results were secured this year:

| *Plat No.* | *Treatment* | *Yield of Corn Bu. per Acre* |
|---|---|---|
| 1. | Crimson clover, grazed closely till April 15, then allowed to grow 18 inches high, turned under May 15. 124 pounds 8-3-3 fertilizer used per acre | 41.5 |
| 2. | Crimson clover, grazed closely till May 15, then turned under. 125 pounds 8-3-3 fertilizer used per acre | 37.7 |
| 3. | No crimson clover. 125 pounds 8-3-3 fertilizer and 200 pounds of 0-0-2 top dresser used per acre | 34.6 |
| 4. | No crimson clover. 125 pounds 8-3-3 fertilizer used per acre | 26.1 |

In this demonstration, the cost of sowing the clover was $5.00 per acre, and the cost of the top dresser used on plat 3 was $5.00 per acre. The clover afforded at least $10 worth of grazing per acre, and more than took the place of the top dresser. The grazing was clear profit, as was shown by the increase in corn yield of plats 1 and 2 over plat 3.

An all-day field meeting, punctuated by a barbecue dinner, was held at this demonstration. The farmers present, 20 in number, harvested and weighed the corn from each plat. G. M. Garren, of the Division of Agronomy, demonstrated field selection of corn. Jones County has heretofore grown cover crops very little. It is hoped to increase their use through this and other demonstrations.

Of the total thirty-eight demonstrations, seventeen have been abandoned, for various reasons, leaving twenty-one in operation. Field meetings have been held at twelve of these. One hundred and sixteen people were present. Most of them are in the first stage, showing simply the effect of lime on the first crop. Next year they will be in corn, and we hope to have many meetings like the one in Jones County.

Mr. Blair has prepared and staged exhibits at three county fairs, acted as judge at three county fairs, and superintended the Corn Show at the State Fair. The exhibits were planned to show important facts concerning the problems with which we are dealing and elicited much favorable comment. This is one of the most effective ways to reach a large number of people, many of whom would not otherwise be reached at all. While judging at a fair, one has a great many opportunities to point out the value of good farming methods in producing crops of high yield and quality. The Corn Show at the State Fair has been greatly improved and is getting to be an event of real educational value. It is estimated that 3000 people, at the very least, have been given effective instruction at fairs.

In addition to the above work, the writer attended the State meeting of county agents at Raleigh in January, the meeting of the Eastern and Northern Districts at Wilmington in July and the meeting of the Central District at Jackson Springs in August.

## EXTENSION CROP IMPROVEMENT

*Community Seed Improvement.*—Community seed improvement work has been the major field crop Extension project of the past season. The work has consisted of community variety and seed selection demonstrations with cotton, corn, wheat, oats, rye, soy beans and sorghum. The requests for help in this work have been much greater than the present force of workers could handle during the planting and harvesting season. While some of the communities organized in the past are well established and require little attention, most of them require inspection and help to keep their seed up to standard and to prevent the introduction of new varieties or old varieties under new names. Changes in county agents have also made it necessary to repeat some of the

work. During the past season, a special effort was made to reach a few cotton growing counties that do not have county agents, and others that have recently secured agents. The cotton variety demonstrations were extended to fourteen communities in ten counties. Two of the counties reached in this work did not have the services of a county agent and were growing very inferior varieties of cotton. Field selection demonstrations were conducted in 24 communities of eleven counties. These communities will produce approximately 40,000 bushels of improved cotton seed. Since the work started, in 1914, 105 communities in 36 counties have been reached in the work. In only two of the 105 has the work failed to introduce a better strain of cotton. The average increase of the improved strain over the variety generally grown in the community has amounted to $22.32 per acre. This season, thirty-three counties were given help in the improvement of their cotton seed. As a result of community variety demonstrations and exhibits, 10,850 bushels of improved cotton seed were introduced this spring into communities that had previously grown inferior varieties. In addition to this, the cotton breeders, with which the Division of Agronomy is cooperating, sold approximately 12,000 bushels in their local communities and 6,750 bushels were shipped out of the State.

*Community Seed Corn Improvement.*—The community corn improvement work has consisted of community variety demonstrations and field selection demonstrations, with the purpose of establishing uniform standard varieties in each community. Since corn is grown very generally over the State, an effort has been made to locate the demonstrations so as to form seed corn centers for the different sections of the State. This work was conducted in 28 communities of 19 counties. These counties are distributed as follows: One in the Mountains, 10 in the Piedmont and 8 in the Coastal Plain section. Five of the eight demonstrations in the Coastal Plain section are located in the tidewater section, where corn is an important crop. The communities of Edgecombe, Chowan, Gaston and Forsyth counties that have been established three or more years are showing considerable progress. This is particularly true of the Cherryville community of Gaston County, where the Division of Agronomy has been coöperating in a community corn show during the past four years. The display of more than 300 uniform exhibits of ears this year was quite a contrast to the mixture that was exhibited at the same place four years ago. On account of the general interest in seed corn selection in this community, it has become a popular source of seed corn in that section of the State. In addition to the community work, individual help has been given six established corn breeders of the State.

*Community Small Grain Work.*—The community small grain work has consisted of following up communities in which improved seed have been introducing improved small grain in new communities, and in conducting variety demonstrations. The follow-up work includes the

inspection of increase fields and examining the harvested seed for mixtures and germination. The increase fields were located in nine counties and included 24 fields of wheat, 11 of Abruzzi rye and 5 of pedigreed oats. The amount of the harvest from the fields that could be recommended for seed purposes was 5,300 bushels of wheat, 2,600 bushels of Abruzzi rye and 1,155 bushels of pedigreed oats. Lists of these sources were prepared and supplied county agents, inquiring growers, and roller mills. On account of the large shipments of Rosen rye sent into the State from Michigan, some time was spent in giving publicity to its poor qualities when grown under North Carolina conditions. The growers of improved small grain seed found ready sale for their seed. Records are being kept of growers who secured improved seed with the object of establishing sources of good seed in other communities.

*Soy Bean Improvement Work*—The soy bean work has consisted of variety demonstrations, supplying growers with pedigreed seed from the Experiment Station selections, and listing growers who have good seed for sale. During the year, nine soy bean demonstrations were conducted in eight counties. Growers, county agents and vocational schools of 34 counties have received help in presenting soy bean information to the farmers of their different sections. This includes 7 Mountain counties, 9 Piedmont counties and 18 Coastal Plain counties. The soy bean work has been pushed, with the object of establishing the crop in communities that are not generally growing it and to improve the seed produced by the older soy bean sections. Since the soy bean has become more popular as a hay plant there has been considerable interest in the increase of the Station's pedigreed strain of Virginia soy beans. The new strain of Haberlandt No. 38 has also met with success in the Piedmont and Mountain sections. It will become to the Mountain and Piedmont sections what the Mammoth Yellow has been to the eastern section. All of the vocational schools have been supplied with samples of soy bean seed of varieties best adapted to their sections. These seed have been used for teaching specimens and for conducting field demonstrations.

*Sorghum Improvement Work.*—One grower has been established in the growing of pure seed of the Honey sorghum. Approximately 200 pounds of this seed was sold to growers of the State last season, and 3,000 pounds have been saved this year.

*General Field Crop Extension.*—In addition to the regular extension projects, the Division of Agronomy has been called upon for more general services. During the past season this has included a two weeks' boll-weevil campaign, covering twelve counties; in preparation of exhibits for six county fairs; preparation and handling of two pure seed exhibits for aiding county agents in the introduction of improved seed; in judging at five county and three community fairs; in conduct-

ing part-time classes for adults in two vocational schools; in preparing charts and other information for county agents and teachers of agriculture in vocational schools, and in conducting a meeting of the State Seed Breeders' Association.

## SUMMARY OF FIELD AGRONOMY EXTENSION ACTIVITIES IN CROP IMPROVEMENT AND SOIL FERTILITY

### IN CROP IMPROVEMENT, BY R. Y. WINTERS, S. W. HILL, P. H. KIME AND G. M. GARREN

| *Nature of Coöperation* | *Nature of Work* |
|---|---|
| 50 County Agents | Seed improvement demonstrations, newspaper articles, circular letters, charts, seeds, identification of weeds and varieties of field crops, examination of seeds, information on best varieties and cultural methods, and exhibit material. |
| 68 Communities | With definite seed improvement projects. |
| Newspapers and Farm Journals | Sixty-four newspaper articles to daily and weekly papers reporting local demonstration work and general timely articles supplying information of general interest to the section of the State. Every section of the State was represented in this work. |
| 26 Vocational Agricultural Schools | Supplied with specimen field crop seed, information for teaching work, and aid in the conduct of part-time classes for adults. |
| 5 Banks | Conducted field crop exhibits in their lobbies for the purpose of introducing better seed in their counties. Each of these banks helped finance the introduction of good seed. Resulted in the introduction of 1385 bushels of pure cotton seed. |
| 1 Oil Mill | Supplied articles and circular letters on spacing cotton, and selection of seed to meet boll weevil conditions. |
| Ginners | Supplied information on the importance of coöperation with cotton growers in saving their seed pure at the gin. Several public gins have given splendid coöperation in this work. |
| 5 Cotton Mills | Coöperated in the introduction of better varieties of cotton and supplied information on the spinning qualities of North Carolina grown cotton. |
| County Welfare Officer | Coöperation in a county that had no agricultural agent in the introduction of 1000 bushels of improved cotton seed. |
| Fairs | Coöperated with the State Fair, 7 county and 2 community fairs in presenting information on the importance of improved seed. |
| Cotton Marketing Association. | Coöperated in the preparation of 3 exhibits to show the importance of using good cotton seed of approved varieties and the mill waste that comes from poorly picked and badly ginned cotton. Started work on the location of 100,000 bushels of inspected cotton seed of improved varieties, to be used in the State. |

| | |
|---|---|
| Seed improvement Association | Conducted a meeting of the State Seed Association at the State College and coöperated with the local association in the sale of 30,000 bushels of improved cotton seed, 2,000 bushels of seed corn, 4,000 bushels of wheat, 2,000 bushels of oats, 2,500 bushels of Abruzzi rye and 50,000 bushels of soy beans. |
| Department of Plant Pathology | In the inspection of seed for diseases. |
| Seed Laboratory | In the germination and inspection of samples of seed from breeders and other growers. |

DISTRIBUTION OF WORK

| *Workers* | *Specialty* |
|---|---|
| R. Y. Winters | General Seed Improvement and Cultural Work. |
| G. M. Garren | Corn and Small Grain Seed Improvement and Culture. |
| P. H. Kime | Summer and Winter Legume Seed Improvement and Culture. |
| S. W. Hill | Community Cotton Improvement. |

The above is the true organization of the work, though at all times the rush of work in spring and fall has required the teamwork of all workers, regardless of specialty. In order to conserve time and travel expense, the work has been scheduled according to sections of the State, so that one worker may handle two or more projects in several counties if possible.

| | |
|---|---|
| Number counties reached with a definite project (5 of these had no county agent) | 55 |
| Number of field meetings | 51 |
| Attendance (average) | 8 |
| Indoor meetings | 73 |
| Average attendance | 61.1 |
| Number circular letters written | 13 |
| Total number circular letters sent out | 7,334 |
| Number letters dictated | 2,248 |
| Number newspaper articles prepared | 64 |
| Office consultations | 205 |
| Number miles traveled | 18,598 |

SOIL FERTILITY, BY W. F. PATE

During this period, 12 county agricultural agents were visited and 22 demonstrations were also visited. While with the county agents, nine different farmers were visited on their farms, and advice given relative to their soils, fertilizers and crop rotations.

Forty samples of soil were examined for soil acidity, and the amount of lime to neutralize was determined. The type of these soils was established and the fertilizer requirements for special crops were recommended.

During the year, 20 meetings were attended, and 1,500 people were present at these meetings. Lectures were given on subjects that were timely and in which the farmers were then interested. These subjects included the fertilization of corn, wheat, cotton and tobacco; the rotation of crops to use for the Mountain, Piedmont and Coastal Plain

sections of the State; and the value of using legumes for improving the soils.

During the year, 550 letters were written, answering questions that came to this office, relative mostly to soils, crops, fertilization, pasture mixtures and lime. As a great number of these letters require the looking up of results of field investigations, more time was used in this correspondence than would have been had the questions been simply of a general nature.

During the year, conferences to the number of 75 were entered into. These conferences covered practically all of the subjects relative to agriculture, but the majority were related to fertilization and the growing of crops. During the year, 652 miles were traveled by automobile and 7,700 by railway. The following articles were prepared and sent out to the newspapers at the time when the subject was timely: "Sow Cover Crops This Fall," "Last Call for the Sowing of Winter Cover Crops," "Should Liming Generally Be Practiced in North Carolina Agriculture?" "Farmers May Make Their Soils More Productive by Growing More Organic Matter," "Value of Cover Crops to Maintain Soil Fertility," "Growing Cotton in North Carolina," "Growing Cotton Under Boll-Weevil Conditions," "Cultivate Your Cotton Frequently," "Growing Crops," "The Use of Fertilizers for Cotton Under Boll Weevil Conditions," "The Value of Sulphur on North Carolina Soils," "The Use of Fertilizer on Growing Crops," and "Proper Cultivation and Late Application of Fertilizer for Cotton."

The following lectures were given: "Fertilization of Cotton," "The Use of Legumes for Soil Improvement," "Methods of Testing Soil Acidity," "Wheat and Oats Fertilization," "Best Cover Crops to Use."

From the calls made for information at lectures and the attendance at the meetings, it is evident that the farmers of this State are seeking more information regarding the fertilization, rotating and handling of soil and crops, in order that they may increase the production of crops at a lower cost. They are beginning to realize that some method of selection is needed in the selection of plant-food materials for the different crops and for the different types of soil. This seeking for explicit information relative to these things is, in my mind, caused by the active work being done throughout the State along agricultural lines by the Extension workers of the Soil Fertility Section of the Division of Agronomy.

IN CROP AND SOIL FERTILITY WORK, BY E. C. BLAIR

*Wholly Through County Agents*

| | |
|---|---|
| Number of meetings held | 79 |
| Total attendance at meetings | 1,610 |
| Average attendance at meetings | 20 |
| Number of farmers visited | 300 |
| Number of field demonstrations started | 38 |
| Number of field demonstrations now running | 21 |
| Number of visits to demonstrations | 80 |
| Number of fairs attended | 5 |

| | |
|---|---|
| Number of exhibits at fairs | 8 |
| Number of people reached at fairs | 8,000 |
| Miles traveled by railway | 8,478 |
| Miles traveled by auto | 6,319 |
| Total number of counties visited | 80 |
| Total number of people reached directly | 4,910 |

Prepared 37 special and timely articles on farm problems. These were sent to newspapers of the State, to county agents and to teachers of agriculture in farm life schools and in high schools of the State.

In closing this report, I wish to commend most heartily the fidelity to duty of each individual member of the working staff of the Division of Agronomy. Dr. Winters and his co-workers have actively pushed the experimental and extension work in crop improvement; Mr. Pate, in soil fertility, and Mr. Moss and Mr. Mathewson, in the tobacco investigations. Mr. Blair has spent his time in crop and soil fertility extension work with county agents.

Respectfully submitted,

C. B. WILLIAMS, *Chief,*
*Division of Agronomy.*

# DIVISION OF BOTANY

## LINES OF WORK OF THE DIVISION

### Seed Testing

The testing of agricultural and vegetable seeds, in compliance with the State seed law, is, perhaps, the most important line of work committed to this division of the department. During the past two years there have been sent to our seed laboratory 3,449 samples of agricultural and vegetable seed to be examined and tested. These samples came largely from farmers and seed dealers, though a considerable number was collected by our seed inspectors who are sent out from time to time to keep watch over the activities of the seed trade.

### Plant Identification

It is interesting to note the increasing interest that is being taken by the farmers in the weed enemies that infest their lands. Each year brings many new plants to this office for identification with a request for methods of control and eradication. Once the farmer learns the name, life history, and habits of his weed pests he will be in better position to combat them.

### Cleaning Tobacco Seed

The farmers find good results from the use of recleaned and graded tobacco seed. Their interest along this line is constantly growing. The past two years we have recleaned and graded 243 pounds of tobacco seed—enough to plant 50,000 acres of tobacco.

### Distribution of Seed Tags

The revised State seed law, requiring a State seed tag to be attached to packages of seed weighing ten pounds or more, went into effect on July 1, 1921. Since that time we have distributed over 150,000 tags. The revised statute gives free service to farmers and local dealers but charges dealers outside the State for services in our laboratories.

### Licensed Dealers

Our seed law requires every seed dealer in the State to do business under authority of a license issued by this department. But provision is made in the law for a licensed consignor to sell his seeds through a consignee who may not have a license in his own name. This provision of the law may explain why some seed dealers sell seeds, apparently, without a license—they operate under the license of the wholesale dealer whose seeds they handle. The number of licensed dealers doing business in North Carolina in 1921 was 81; the number in 1922 is 105.

### DISTRIBUTION OF NITRO-CULTURES

The demand, on the part of the farmers, for inoculating cultures for legumes continues strong. Since we first began sending out nitro-cultures in 1915, we have distributed enough to inoculate sufficient seed to plant between 30,000 and 40,000 acres of land.

### PLACING MARKET GRADES ON GRAIN

The botanist in charge of this Division was given a Federal license to grade grain on August 6, 1920. Since that date the millers and grain dealers of the State have had an opportunity to have the proper Federal grade placed on any shipment of corn, wheat or oats. There is, at present, no charge for the service. To date we have graded about 90 cars of grain on which either no grade had been placed or the grade was in dispute.

### DISTRIBUTION OF AGRICULTURAL LIMESTONE

The depressed financial condition prevalent throughout the country during the past two years has greatly affected the demand for agricultural limestone in this State. Our plant in Tennessee has been in operation for a good part of the time, but the total distribution has not been what the need for this material would indicate. The total for the two years is only 3,071 tons, whereas, five times this amount should have been sold. The lime plant is in excellent condition and ready to supply any reasonable demand that is likely to be made upon it.

J. L. BURGESS, *Botanist.*

# HOME DEMONSTRATION WORK

Reports from the fifty-three counties organized for home economics work with rural women and girls give most satisfactory records of results accomplished. The program included work in nutrition, the care, preparation, and preservation of food, clothing, household management, household furnishings, beautification of the farmstead, poultry work, dairy work, gardening and recreation. No one county could compass all these projects but subjects were selected and programs made for primary, secondary and advanced work as per the plan the county councils and home agents worked out. In the same county, work might be primary, intermediate, or advanced and both subject matter and methods would be modified to meet conditions.

| | |
|---|---|
| Number counties organized | 53 |
| Number counties reporting | 53 |
| Number women's clubs | 544 |
| Membership | 9,350 |
| Number girls' clubs | 544 |
| Membership | 9,350 |
| Number community clubs | 172 |
| Membership | 7,819 |
| Number counties having county councils | 35 |
| Membership | 1,967 |
| Total number of club meetings held | 8,916 |
| Total attendance at meetings | 211,930 |
| Total number other meetings held | 2,151 |
| Total attendance | 203,130 |
| Grand total of meetings held | 11,167 |
| Grand total attendance at meetings | 415,060 |
| Number of homes visited | 12,210 |
| Number of schools visited | 3,821 |

Nutrition has been and probably always will be, the most important project undertaken in every county. Poultry work, dairy work, and gardening are made to relate to nutrition and these projects have been more successful because club members have realized the relationship. The county report shows that 7,093 girls and 6,738 women made a study of food values and the better preparation of food.

## Statistics

Number counties reporting work in foods 42

| | Girls | Women |
|---|---|---|
| No. club members enrolled in food work | 7,093 | 6,738 |
| No. demonstrations given in well-planned meals | 290 | 368 |
| No. demonstrations given in loaf bread and rolls | 376 | 452 |
| No. demonstrations given in quick breads | 670 | 332 |
| No. demonstrations given in meat cookery | 83 | 224 |
| No. demonstrations given in vegetable cookery | 115 | 315 |
| No. demonstrations given in milk cookery | 296 | 157 |
| No. demonstrations given in use of fireless cooker | 107 | 125 |
| No. demonstrations given in use of steam pressure cooker | 129 | 133 |
| No. demonstrations given in making fireless cooker | 92 | 74 |

| | Girls | Women |
|---|---|---|
| No. fireless cookers made | 129 | 148 |
| No. club members using fireless cooker | 209 | 630 |
| No. club members using steam pressure cooker | 13 | 213 |
| No. club members using thermometer | 21 | 449 |
| No. county-wide campaigns teaching use and value of milk | | 11 |
| No. city campaigns teaching use and value of milk | | 3 |
| No. counties where proper school lunches have been demonstrated | | 18 |
| No. counties where bread campaigns have been held | | 25 |
| No. county campaigns for use of pressure cooker | | 5 |

## METHODS

*Methods of instruction are:*

First, through systematically planned lecture demonstrations given by the home agent, specialist, and by local demonstrations or leaders she has trained. These are given to women and girls at their club meetings which are held fortnightly or monthly.

Second, through county-wide campaigns with or without the co-operation of farm agent, schools, county health officers, and welfare officer.

Third, at community, county and State fairs through demonstrations and educational exhibits.

Fourth, through circular letters, bulletins, papers and periodicals.

## STORIES OF RESULTS

The Forsyth home agent says, "In one school where I was holding a club meeting, I found a very pale little girl who looked as if she might have tuberculosis and upon inquiry, I found she had lost her mother from this disease. It happened that the lesson for the day was on soups, and I demonstrated cream of tomato, and all the children, including this little girl, were delighted with it. On my way home I stopped to see her sister and told her to have the stove ready the day of my next meeting and I would go an hour earlier and stop and show her how to make other milk dishes that this child might get as much milk in her diet as possible. The sister told me later that the little brother said he wished he were bigger so he could hold more soup; and 'father thinks there is nothing like it.' The little girl has improved much and is really drinking the whole milk every day now."

In December, 1921, the Rowan women and girls took up the study of foods. Each club and some of the individual members purchased copies of "Feeding the Family" by Mrs. Rose. At the club meetings in December, January, February and March, the clubs discussed feeding the family from the youngest to the oldest.

The Brunswick home agent, in her rounds in midsummer, visited a home where she found a six year old girl, who had never walked. She was not surprised when she found that bacon, grits, corn bread and coffee was her principal diet. The agent talked over the situation with the parents and urged them to purchase a cow. The father promised

that he would when they got the stock law. At a later visit the home agent said that she did not know the pretty little girl who met her and who was able to walk by holding on to the banister. The little baby boy was also a rosy cheeked, healthy looking fellow. The mother, replying to the remark of the home agent that the children must be drinking milk, said, "Yes, and I give you the praise for the cow."

In Greene County a woman told the agent that her heart quaked when she thought of what, in the years past, she had fed her children.

Better and more nourishing school lunches have been given special attention in 18 counties and the women's and girls' clubs in the communities have heartily coöperated in helping to forward the project.

Anson County sends this report: "We held campaigns in the school communities last winter to promote the hot school lunch. Two of the schools where a great many children were brought in from rural sections on trucks, put the hot lunch on for ten weeks. At Morven the Woman's Club bought an oil stove, pots, and serving pitcher for each room. The children furnished cups which were supplemented with cups and spoons secured by the home agent. The children brought milk from home or a small amount of money for cocoa, which was served four days in the week. Vegetable soup with rice was served on Wednesday. The high school girls were detailed in squads to prepare the lunch. The first week it was attempted, the agent assisted in working out recipes and amounts. She also visited the schools during the period to note the success of the plan. At Lilesville, the plan of the hot lunch was financed by the Woman's Club, supplemented with things brought from home. Each teacher, with the aid of the larger girls, prepared the hot soup for her own room. As the school room stoves were flat on top this could be easily done. The children enjoyed it immensely and all the town children wanted to stay too. In the summer 250 quarts of soup mixture and tomatoes were canned by mothers and donated for winter lunches."

In Halifax County the agent who undertook home demonstration wokr the first of June has this to say: "Soon after I came to the county, the rural supervisor said she would like for me to talk before the county teachers' conference on 'School Lunches.' I was very glad, for it gave me an opportunity to meet the teachers, besides getting this question before them. I made definite plans for the talk, putting special emphasis on the serving of one hot dish at the noon hour. I outlined a plan by which such a program would be possible and also how necessary supplies and utensils might be obtained.

"In two of the schools the girls are doing the work under the supervision of the teacher, and they have it so divided that it takes only two or three at a time from classes. When the girls are on duty they plan their menus and see that the supplies are on hand.

In one community a woman gives all the milk needed and some of it is sold for three cents a glass. This money is used to buy other

supplies. A very small sum is charged for the lunch, only enough to make expenses.

"In another place the children bring a great many of the supplies from home, such as potatoes, canned tomatoes, milk, eggs, etc., and no charge for the hot dish is made.

"I have not, however, let the hot lunch receive all the attention. I have talked almost as much about the cold lunch brought from home and one teacher said there had been a wonderful change in the kind of food put in the lunch boxes of the children. Several of the women's clubs have asked me to demonstrate the cold lunch and method of packing, to them before school started, and this is one demonstration that every one seemed to enjoy. In most of these places I gave them printed copies of menus to be used in the lunch box, and in these menus I tried to put things which I knew were to be had in the majority of country homes.

"The teachers realize the importance and value of the nourishing lunch and have been willing to coöperate in any way that they possibly could to make the scheme a success."

The home agent in Beaufort County in cooperation with the county agent put on a Live at Home Campaign. The importance of the family cow was first stressed. The farm agent talked on permanent pastures and the home agent on the value of milk in the diet. Sixteen community meetings were held where we talked to the parents. One old fellow was heard to say, "Well, I guess she was right, and I will have to get a cow for the children." The next phase of the campaign undertaken was the garden work. The home agent talked about the importance of vegetables in the diet and tried to interest the people in a year round garden. Government seed were distributed.

In coöperation with the county nurse and the home demonstration club women of the communities, the home agent is trying to impress upon children and mothers the necessity of proper feeding. This they do by measuring and weighing rural children, noting results and finding out just what are their food habits. Remedial diets are suggested and the value of milk and vegetables stressed.

In Wayne County the home demonstration agent prescribed a wholesome diet for certain underweight children whose interest developed after the weighing and measuring by the county nurse. This was done in seven schools where scales were installed.

In New Hanover County the home agent and county nurse weighed 728 children in 12 rural schools. Of this number 176 were up to normal while 552 were under or overweight. Talks on food with the use of food charts corrected many of the bad eating habits among the children and with the consumption of more milk has brought them up to normal weight.

In the three "Milk for Health" campaigns which were put on by the Division of Home Demonstration and the Division of Animal Industry

coöperating, the assistant State home demonstration agent relates the following: "In 1922 the Division of Home Demonstration work in coöperation with the Division of Animal Industry put on milk for health campaigns in three cities—High Point, Greensboro, and Raleigh. In High Point over 3,000 children were reached, in Greensboro and vicinity 6,848 children and something like 3,000 adults, and in Raleigh 3,500 school children heard the lectures and saw the demonstrations. A survey which was made as a part of the 'Milk for Health' weeks in the three North Carolina cities shows the following:

| | Greensboro | High Point | Raleigh |
|---|---|---|---|
| Drinking tea or coffee | 36.7% | 42% | 49 % |
| Not drinking milk | 22 % | 13% | 20 % |
| Drinking milk regularly | 56 % | 60% | 51.9% |

"In Greensboro we found that work had already been done in weighing and measuring the school children at the beginning of the school year. A certain per cent of both white and colored children were found underweight. Continuing along this line at the close of the active part of the campaign we put on a feeding experiment. Twenty children, all of them at least six pounds underweight, and one as much as 25 pounds, were selected and given one pint of milk per day for eight weeks. They were weighed and checked every two weeks. At the end of the experiment period we found an average gain of 3.73 pounds, which does not show all the results by any means as each teacher reported improved physical condition and more mental alertness. The Poster Contest was a part of each city campaign. Prizes were offered for the best milk poster from the Primary, Intermediate, and High Schools, and much interest was aroused in this way. The publicity given in these campaigns all that could be desired. Both the morning and afternoon papers carried articles for which we provided the material and some of the stores inserted lines about the value of milk in their regular advertisements.

"The financial side of the campaign was looked after by the Chamber of Commerce coöperating with local organizations and individuals. Since I had been delegated to look after this work I went, in each case, to the town one week before the actual campaign. The time was spent in getting the coöperation of the Mayor, Board of Health, City School Superintendent, Chamber of Commerce or Board of Trade, Medical Association, Woman's Club, Parent Teachers' Association and any nurses or hospital officials in the town. During this week a member of the Animal Industry Division came in and looked after the local dairy situation. Following this preliminary work, Mrs. McKimmon sent out four additional demonstration agents for the week of the campaign. These agents with myself followed a schedule by which we spoke to every child of school age, both white and colored, in the town and to adults in clubs, factories, mills, laundries," etc.

Nutrition work was carried on in coöperation with the Division

of Animal Industry at the State Livestock Meeting at Elizabeth City. Here, with the help of the local home agents, a demonstration was given on each of three days. These showed three balanced meals for children of different ages, stressing the use of milk and milk products. A demonstration on weighing and measuring was also given for the school children.

### BREAD CAMPAIGNS

Campaigns for better bread in every rural home have been carried on in 25 counties in 1922.

The plans for a Better Bread Campaign for Davidson County were all made in October, just after the fair season closed. First, the co-operation of the County Commissioners was asked. They agreed to finance the campaign in two ways. To pay for all printed matter and to finance all demonstrations. A very good list of prizes was secured, the four grand prizes being trips to the State Short Course for girls and two trips to the 1922 State Fair, both held at Raleigh, N. C. Two business men and the four banks of the county gave these trips.

The agent says—"After getting my material together an itinerary was made out for November, December and January, which included one demonstration in each school of the county, 72 in all. Extra time was taken for second visits to many of the schools. In 69 of the 72 schools the agent made and baked the biscuit with the pupils following the directions which had been given them at the beginning of the meeting. After the demonstration each girl was given an enrollment card which she was to carry home with her, ask her mother if she should enroll and return it to the teacher next day, who sent them to the office. This was done for three reasons: to eliminate the joiners by 'lifting the hand,' who usually stop at that, to attract the attention of the mother, and also make the teacher feel that she had a part in the contest, which she surely did.

"While the biscuits were baking I always had the girls present to give me their names, addresses and ages on a slip of paper, whether they intended to join or not. This gave me a good record of the girls over the county. Then, upon returning to the office each night a circular letter was sent out to each girl impressing them with the idea of joining the contest. This was carried out after each visit. When the enrollment cards were received from the schools a record book was sent to each member in which she was required to write down the results of her bread baking for at least six times. It was interesting to read the records of these little girls. Some would say, 'Mother says my bread is better than hers,' others would tell why their biscuits were not good, the stove was too hot, or the baking powder was not good. During the entire time I emphasized the importance of a good leavening agency. More than 300 mothers changed their brand of baking power, using a better powder in every instance.

"At the close of the contest at Lexington, although it was the coldest day of the year, more than 500 people were present. The court house was filled. Many fathers and mothers were there. The program for the day included an address from the State Home Demonstration Agent and an inspirational talk on club work by the Club Leader of the State. 559 girls enrolled in the contest, and carried on the project as was directed. Many girls and women used the recipes who did not join. 2,500 recipes for making bread were given out. 217 brought biscuits to the county contest and 65 schools held the try out contests. More than 1,500 people were reached and the first and second prize winners of the county entered the State Biscuit Contest, where one won the first prize and the other won fourth.

Fifty-eight demonstrations in making biscuits were given in Bladen County and 41 in Cumberland, 500 girls and boys in each county being enrolled in the contest. After the demonstration is given at the school house, a township contest is held, and then the winners are brought to the county seat and the winner has a chance to enter the State contest at the State Fair."

The following is the report of the Durham County Bread Campaign: "The first of April we began our bread campaign. Rolls for the women and biscuit for the girls. I have given 20 demonstrations of each, reaching all county schools but three. This campaign for better breads was the second one held in the county. A member of the Board of Commissioners who was present at the December meeting of the County Council when plans for 1922 were being discussed asked that another campaign be put on, as he felt that the first county-wide instruction for better breads was worth more to the county than all the money it ever put into demonstration work."

The following comes from Rockingham County: "The subjects taken up in foods this year have been biscuit campaign for girls; yeast breads with women; school lunches with women's clubs; balanced meals with women and girls; steam pressure cookery of meats and vegetables; fireless cookery of meats and vegetables; cake baking; cooked and uncooked icing; candy making; and table serving.

"The things that the women have liked most were cooking with the labor saving fireless and pressure cookers; balanced meals, and cake decoration.

"The girls have been most interested in biscuit work, candy making, and table service. At the fairs this fall could be seen results of each of these lines of work. Better bread on display—hence better bread in the home. One girl wrote in her record of work in the biscuit campaign, 'My very first biscuits were better than those we usually have. Papa said they were the best he had ever eaten.' "

## CONSERVATION OF FOOD STATISTICS

| | |
|---|---|
| Number counties reporting conservation of food | 46 |
| Number demonstrations in canning, for girls and women | 11,044 |
| Number quarts vegetables and fruits in tin and glass | 1,324,096 |
| Total value of vegetables and fruits in tin and glass | $168,785 |
| Number quarts fruits and vegetables sold | 60,666 |
| Value of fruits and vegetables sold | $15,166 |
| Number quarts preserves, jams, marmalades, etc. | 82,010 |
| Value of preserves, jams, marmalades, etc. | $80,000 |
| Number pints jelly | 99,151 |
| Value of jelly | $49,575 |
| Number quarts sold of sweet products | 5,921 |
| Number quarts fruit juices made | 6,894 |
| Number quarts vinegar made | 53,293 |
| Number quarts catsup made | 8,863 |
| Number quarts pickles and relishes | 73,397 |
| Value of vinegar, catsup, pickles, etc. | 55,047 |
| Number pounds canned meat, poultry and fish | 6,664 |
| Value of canned meat, poultry and fish | $3,332 |
| Total number of containers filled | 1,720,905 |
| Total value | $371,905 |

Canning fruits, vegetables and meats and the making of jelly, jams, preserves, pickles, etc., have been taught in 46 counties.

The advent of the boll-weevil and hard times generally have given an added impetus to the saving of food for the family table and for the market.

Many a pantry that formerly held commercially canned products is now well stocked with home grown and home canned fruits and vegetables.

The Scotland County home agent says: "The first work I did in Scotland County after returning from the Annual Conference in Raleigh in June, was to prepare and hold a two days' canning school in the new office which was just ready for use.

"I held the school in order that I might teach as many of the women in the different sections of the county as possible, and they could go home and give the demonstrations in their communities. I chose leaders to do the work under my directions. In this way I was able to have more things canned than would have been possible otherwise. We canned in glass and tin. I was fortunate at this time to have the man who demonstrated the Burpee Sealer in town and he showed the women how to seal cans.

"At the two demonstrations there were 50 women and one man. There would have been more had not a terrible storm broke at meeting time. During the lessons 87 bulletins on canning and jelly making were given out."

The Beaufort County agent says: "This was a good canning year as there was an abundance of fruits and our promotion of gardening in Beaufort gave the housewives an opportunity to can more vegetables than ever before. $8,876.00 worth of fruits and vegetables were conserved."

To arouse interest in girls' club work and to create a teaching force for next year the Mecklenburg home agent organized a class of girls which represented the entire county. Twenty-six members were enrolled from eleven different townships. She says, "During July and August these girls met each Saturday morning in my small laboratory where they were taught to can fruits, vegetables, jelly stock and fruit juices. They also made pickles and jelly. This class sent a special exhibit of jellies and fruit juices to the State Fair at Raleigh in October, winning first county prize on the exhibit and every blue ribbon on the six different classes of jelly."

The central district agent who is also the food specialist, has the following to say of her pupils at the girls' annual short course: "I gave the lecture and made jelly from orange pectin and muscadine jelly stock. The girls were very much interested in the crystals of cream of tartar found in the jar of stock and in how to get rid of them. Many of them went home to give demonstrations to groups of both women and girls."

The farm agent of Bladen said of Katherine Clark, "She gave as interesting and effective a demonstration at the encampment of how to make good jelly as any trained agent could have given."

The food specialist says: "I have furnished several commercial concerns with data conerning the manufacture of grape and apple products and have helped them to get in touch with manufacturers of equipment. I have especially enjoyed this work as Mrs. McKimmon and I have been so interested in experimental work with grapes and apples for a number of years, and I feel that our work is bringing results when we are able to actually help these concerns. It shows, too, that the work we have been doing with our women along this line is attracting attention in the commercial world. When we found that there was a profit of $5.00 in a bushel of grapes if the farm woman manufactured it into jelly, etc., in her own kitchen, after allowing $2.00 for the grapes, the news spread and calls have poured in for information and assistance.

## CURED MEAT

### STATISTICS FOR THE STATE

| | |
|---|---|
| Number pounds corned beef | 1,025 |
| Number pounds pork cured | 1,536,164 |
| Number pounds sausage made | 330,076 |
| Number pounds lard made | 169,841 |
| Number pounds headcheese, scrapple, pork loaf or other pork products made under agent's direction | 18,173 |
| Total value of cured meats, lard and by-products | $616,583.70 |

Durham, Cumberland and Johnston counties have done excellent work in the canning of meats and in inducing club members to buy pressure canners.

The Johnston County agent says that the people who cured meat with the help of the home demonstration agent last year are passing the

methods on. Interest in canning meat is growing. One housewife canned 97 quarts of beef while a community has ordered a steam pressure canner to take care of the "hog killing." The story of two Johnston County college boys, Elmore and Cronje Earp, is interesting. These boys are at Wake Forest College and are doing light housekeeping. They do their own cooking and all last summer they were busy putting up their "eats" to carry back with them. Elmore is a junior while his younger brother is a freshman. Miss Minnie Lee Garrison, the county home demonstration agent, taught them to can and they put up the following: Two hundred cans of peaches, twenty-five cans of apples, ten cans of pears, sweet pickle peaches, cucumber pickles, pear preserves, grape preserves, one hundred glasses of jelly, canned tomatoes, canned beans, canned peas, fifteen dozen eggs preserved. They also had twenty-one cans of chicken and beef. They get sweet potatoes and Irish potatoes occasionally from home and they get their butter through the mail from home.

## POULTRY

| | | |
|---|---|---|
| Number of counties doing poultry work | | 24 |
| *Chickens* | *Girls* | *Women* |
| Total number demonstrators | 792 | 3,126 |
| Number demonstrators purchasing standard bred eggs | 482 | 1,811 |
| Number dozen standard eggs purchased | 811 | 3,851 |
| Number demonstrators using incubators | 9 | 425 |
| Number demonstrators purchasing standard baby chicks | 11 | 303 |
| Number demonstrators using brooders | 14 | 461 |
| Number demonstrators purchasing standard bred breeding stock | 22 | 421 |
| Number demonstrators using standard bred males to improve stock | 25 | 1,387 |
| Number standard bred chickens purchased | 316 | 5,590 |
| Number poultry houses built | 36 | 557 |
| Number poultry houses remodeled | 42 | 371 |
| Number demonstrators raising feed for flock | 332 | 1,919 |
| Number flocks culled | 102 | 945 |
| Total number in flocks | 8,153 | 95,890 |
| Total egg production | 30,238 | 394,877 |
| Number dozen eggs sold | 3,354 | 141,927 |
| Number of egg circles organized | ---- | 2 |
| Number dozen eggs used for hatching | 1,101 | 55,606 |
| Number of breeders' associations | ---- | 20 |
| Number dozen eggs used at home | 9,003 | 138,303 |
| Number dozen eggs preserved in waterglass | 15 | 1,389 |
| Number standard bred eggs sold for hatching purposes | 366 | 9,039 |
| Total number standard bred chickens raised | 2,727 | 89,955 |
| Number standard bred chickens sold for breeding purposes | 96 | 2,868 |
| *Turkeys and Ducks* | *Girls* | *Women* |
| Number demonstrators | 2 | 101 |
| Number turkeys raised | 8 | 1,782 |
| Number turkeys sold | ---- | 1,405 |
| Number dozen eggs sold | 8 | 6 |
| Total value | $57.00 | $8,062.20 |
| Number ducks raised | 15 | 90 |
| Number ducks sold | 10 | 40 |
| Number dozen eggs sold | 6 | 37 |
| Total value | $33.90 | $203.80 |

| *Equipment Made* | *Girls* | *Women* |
|---|---|---|
| Number self-feeders | 86 | 625 |
| Number water fountains | 205 | 874 |
| Number candling lamps | 7 | 46 |
| Number egg carriers | ---- | 1,207 |
| Number of other equipment | 28 | 1,078 |

With the total value of all poultry and poultry products produced by club members reaching something over $444,261.00, the importance of emphasizing this project with women and girls is manifest.

The Brunswick County home agent says: "Three years ago there was scarcely a flock of pure bred poultry in the county, and now there are numbers started." One woman who has a flock of White Leghorns and has built up quite a trade purchasing poultry en route to town and by milk feeding them, is able to make them put on three-fourths pound per week and sell them at a profit. The poultry work was emphasized by two campaigns put on jointly by the home and farm agents, one in selection and care, the other in making coops, culling and feeding.

Robeson County organized two poultry associations during the year.

The New Hanover County agent says: "Poultry work has a definite place in the county program. Out of 800 chicks hatched by one person 75 died, 150 were sold at 20 cents each for baby chicks, 85 were kept for stock and 390 were sold for fryers at 50 cents per pound. These weighed five pounds at five months. Another person has 500 White Leghorns, having started in the business with baby chicks, while a thousand-hen capacity poultry house has been erected for a third person under the direction of the State Poultry Agent.

Many results of the poultry work will be found under markets where poultry and poultry products were sold.

## THE HOME DAIRY

| | |
|---|---|
| Number Counties reporting dairy work | 24 |
| Number demonstrators enrolled | 2,323 |
| Number milk cows kept by demonstrators and club members | 9,090 |
| Number milk cows purchased through agents' influence | 157 |
| Number demonstrators improving stock through agents' influence | 100 |
| Number demonstrators making butter | 2,361 |
| Number pounds reported made, 514,462; value | $180,061.70 |
| Number pounds reported sold, 63,836; value | $22,342.60 |
| Number pounds cottage cheese made | 2,379 |
| Number pounds sold, 855; value | $213.75 |
| Number gallons of cream sold | 5,900 |
| Number gallons sweet milk and buttermilk sold | 243,225 |
| Number demonstrators using more milk and milk products in the family diets | 3,853 |

*Equipment Made or Purchased*

| | | | |
|---|---|---|---|
| Sanitary milking pails | 232 | Paddles | 359 |
| Dairy thermometers | 94 | Shotgun cans | 36 |
| Butter workers | 12 | Barrel churns | 125 |
| Iceless refrigerators | 33 | Separators | 100 |
| Coolers | 113 | Molds | 571 |
| Brushes | 173 | Cheese presses | 7 |

The report of dairy work is a report of what has been done with the family cow and what the family has done in the way of using milk, butter and cheese in its diet.

The "Use More Milk" campaigns in towns and country, which have been described under nutrition, have been potent factors in increasing milk production and consumption, and the coöperation of the Division of Animal Industry has been of the finest.

The following are interesting items:

In Bladen, three community meetings were held jointly with the farm agent, when the milk separator was demonstrated; 175 attended.

In Cumberland, a four-day agricultural chautauqua was held in coöperation with the farm agent, at four different points; 705 attended. Care of milk in the home was studied by 10 women's clubs.

In Johnston, a milk campaign for one week reached 791 people, and the milk fairy play reached 1,795 people.

In Robeson, four home dairy meetings were held jointly with the farm agent; 250 attended.

In Sampson, five dairy schools were held jointly with the farm agent, when the separator was demonstrated, and the interest created brought about a local sale for cream; 184 attended.

New Hanover reports 300 cows purchased as a result of the "Milk for Health" campaign, at which time a dairy specialist assisted.

Cumberland County was pleased that the dairy specialist, on judging the 12 pounds of butter at the county fair, remarked, "This is the best lot of butter I have judged at any fair in North Carolina this fall." The agent felt that the curb market helped to improve the quality of butter after the instruction was given at the club meetings following the series of meetings which were held for one week in March, when the specialist assisted.

### GARDENS

| | |
|---|---|
| Number summer vegetable gardens | 19,028 |
| Number fall and winter vegetable gardens | 9,318 |
| Total yield of fresh vegetables, in pounds | 17,005,519 |
| Number pounds fresh vegetables used in home | 4,869,888 |
| Value fresh vegetables | $249,345.68 |
| Number of hot beds | 1,128 |
| Number of cold frames | 903 |

### FRUITS

| | |
|---|---|
| Number of demonstrators | 2,755 |
| Total yield, in pounds | 11,017,668 |
| Value of fruits used at home | $97,584.50 |
| Value of fruits sold | $98,241.70 |
| Number of fruit trees planted this year | 33,974 |
| Number vines and small fruits planted this year | 40,725 |

The "Live at Home" campaign was carried on in 47 counties in the State, and did much to revive interest in gardening and in poultry and dairy work.

Club leaders were made chairmen of garden committees. The people pledged themselves to plant larger and better gardens, first to feed themselves and then to sell the surplus.

Miss Gaither put on the garden campaign in coöperation with the county agent. There were 241,240 pounds used at home and $589.50 worth of fresh vegetables sold.

The Halifax home agent says, "As a result of the garden work we did in this county, there were 260 new summer gardens, 100 new winter gardens, and $5,011 worth of vegetables sold. This, of course, included products from the gardens of those who had been growers before this year, also."

The following results are from Pasquotank: As a result of this garden work, 350 summer gardens were planted and 350 fall and winter gardens started, 200 hot beds made and 100 cold frames. Vegetables were sold amounting to $2,667.00.

In Perquimans County the home agent promoted the garden work and no better evidence of the value of this work can be shown than by the fact that on woman exhibited 21 varieties of vegetables growing in her garden in November.

The Mecklenburg agent says: "The Governor's 'Live at Home' campaign has meant a great deal to the farm homes of Mecklenburg County. Our people had the reputation already of living at home, but when an inventory of the gardens was taken, it was surprising to find how few vegetables were grown in the average garden, and how few people had winter gardens. Since this campaign was put on one hundred milk cows have been brought into the county, and gardens have increased 20 per cent. I do not have statistics of poultry. We got started too late in the spring to do much."

The Transylvania home agent says: "The gardening campaign is the only campaign the farm agent and I put on this year. In the spring when the Governor called upon us to assist in the "Live at Home" campaign the county agent and I organized a campaign in gardening. We had a meeting of the county superintendent, editor, ministers and others interested, put notices in papers. The county paper offered $25.00 in prizes to the school children for articles on the value of gardens and home-grown produce, and we invited all schools, distributed seed, and enlisted members in the garden contest. One hundred families were represented, pledging themselves to plant six more vegetables an to exhibit some at the community fair nearest them. A judging committee was appointed and prizes offered for the best garden in each township. The round-off came in with the fairs. Many vegetables were planted that people had thought would not thrive in the mountains. I gave demonstrations in preparation and serving of vegetables. The Live-at-Home program was stressed in all its phases, gardens, the family cow, poultry and hogs, and we took up subjects in each club which was organized."

The Brunswick County agent was pleased to see the splendid garden display of vegetables at their fair in November and said one man realized $400.00 from the sale of his fall tomatoes.

"So many more are planting than ever before, vegetables are much more common on the tables and there are so many fall gardens that I feel like much more was accomplished by the 'Live-at-Home' campaign."

In the gardening campaign the home and farm agents were assisted by a garden specialist and the meetings were held by townships rather than communities.

Miss Albertson, home agent in Pasquotank, reports her two campaigns as follows: "Last fall, our farm agent, the public welfare officer and I coöperated in a garden campaign. Circular letters were sent out, and a large gathering of representative men and women of the county and town met in the Chamber of Commerce rest room to discuss plans for this campaign. A publicity Committee was appointed and committees to hunt up vacant lots and interest people in cultivating gardens. The welfare officer and I canvassed the mill district and interested families in backyard gardens. The mills gave a number of vacant lots rent free to their employees, who availed themselves of this opportunity and quantities of vegetables were raised. Vegetable seeds were sent us by our Congressman, Mr. Ward. These we distributed through county and town. A number of children had patches of vegetables in their backyards, and everybody seemed to have the garden spirit. In the home demonstration clubs a discussion of gardens was held, and roll call was answered by giving the names of the vegetbles each was planting, as a result much more interest is shown in fall and winter gardens."

## MARKETS

| | |
|---|---|
| Number markets established for club products: 7 curb, 2 stall | |
| Number demonstrations given in standardizing products for market, agent 172 specialist 37. | |
| Number club members selling products through markets, 1325. | |
| Number dressed poultry products sold through markets, 4,531; value | $5,664.00 |
| Number live poultry sold through markets, 5,822; value | 5,822.00 |
| Number dozen eggs sold through markets, 5,345; value | 2,672.00 |
| Number pounds butter sold through markets, 1,597; value | 638.80 |
| Number cans fruit sold through markets, 1,420; value | 355.00 |
| Number cans vegetables sold through markets, 5,376; value | 1,055.00 |
| Number quarts preserves, jelly, etc., sold through markets, 578; value | 578.00 |
| Number quarts pickles sold through markets, 203; value | 101.00 |
| Value of flowers sold through markets | 195.00 |
| Miscellaneous | 315.00 |
| Number club members selling through parcel post—82 | |
| Name products thus sold, quantity and value—Butter, eggs, chickens, turkeys, canned goods, etc., value | 17,395.80 |
| Number selling to merchants, 338; quantity sold, 5,430, value | 3,271.50 |
| Number selling direct to consumer—1,622 | |

With farm women all over the State asking for help in marketing the surplus products of their gardens, poultry yards, and dairies, the home

demonstration agent has been called upon for methods of getting these things before the public in salable form. To that end curb and stall markets were launched in nine counties, last spring and summer and have now been in operation long enough to serve as demonstrations of what may be done by getting together.

Where success follows the market venture very definite plans have been outlined for its conduct. The council of farm women composed of representatives from the home demonstration clubs of the county, meets to determine first if a market is really needed. Next it proceeds to find out if products can be had in sufficient quantity to meet daily or weekly demands, and further, just what communities can be looked to for a steady supply. There is a big question of grading and standardization also.

The Division of Markets has helped the farm women by sending outs its specialists to teach them how to make standard and salable packs of their products, and has advised also regarding the equipment necessary for markets. Their specialists have been present at and before the opening of a market, helping to arrange an attractive booth and making suggestions of good business methods for conducting the business.

## THE CURB MARKET

If it is decided that a curb market might meet the need of both the producer and the consumer, a committee from the council visits the city fathers, seeking to secure a parking space on a good street and when this is assigned, each home demonstration club becomes responsible for definite supplies on definite days.

The council decides how many days per week the market shall operate in the beginning and the amount of patronage and the steady flow of eggs, poultry, butter, vegetables, canned goods, etc., are the deciding factors afterwards.

The extreme cold of winter days shortens the life of the curb market in most sections to six or eight months.

The need of better marketing facilities for farm home products was discussed in Greensboro last March and a movement for a curb market was launched by the united efforts of the farm and home agents, the County Federation of Rural Women's Clubs, the Chamber of Commerce and the Woman's Club of the town.

The country producers were promised the coöperation of the city folks and the market was opened May 15th. Tuesdays and Thursdays there is an average of 35 cars selling products and on Saturdays 100 cars.

One family sends its produce by a twelve-year old boy, Tom Pemberton, and he usually sells about $20.00 worth before 10:30. He brings butter packed in ice, the butter properly molded in brick shapes, and fruits and vegetables.

To stimulate interest special feature days were inaugurated. One

day blackberries would be offered at 10 cents or 8 1-3 if bought in quantity, and demonstrations of how to make them into jelly wer carried on at the warehouse in front of which the market was located.

The Lumberton curb market has grown to gratifying proportions. The home agent says, "We take it turn about for the sales. The St. Paul Club brings its club car filled with market products on one day, the Philadelphus on another, the Fairmont on a third, and so on. With this arrangement we have products of each kind each market day including cakes.

"We have two poultry associations in the county and these have a sale every market day. We can thus supply the town with fresh eggs and chickens of the best quality.

"On Saturday, November 18th, the Philadelphus home demonstration club brought in twenty home-made cakes, eggs, butter, vegetables, and nuts. The Rowland car brought twenty dressed hens, from seventy-five to a hundred broilers, and twenty pounds of butter. One club member brought twenty pounds of excellent home-made mincemeat, another lettuce and celery home-grown, and a third the best parts of a hog made up into sausage, liver pudding, etc".

The Cumberland County council of farm women organized the Fayetteville curb market and Miss Talbot, President of the Riverside Club, tells the following story of the success of the venture:

"We did not know exactly what to take to Fayetteville to sell on our first day of the curb market, but I loaded up my car with cabbage, turnips, potatoes, buttermilk, butter, eggs, and chickens, and when I got to town displayed them as attractively as possible in my car. One of my neighbors whom I called for on my way to town said she had nothing but one dressed hen to bring. I persuaded her to take it and we drove into town and backed the car up to the curb. All around us were other cars and it wasn't long before the street was filled with cars and housewives were crowding around to purchase. There have been as many as 45 cars whose occupants were selling at one time. A fair price committee was appointed by our county council of rural women, one member from the council and the other from the city buyers. The prices for commodities agreed upon are posted on the cars and everybody abides by the ruling of the committee. We were all literally cleaned out on the first day of the market and my friend who brought the dressed hen had an order for 12 for the next market day. These days come twice a week, but our customers are demanding that we make it three. The hours are from 8:30 to 11:30 in the morning. We producers are learning what the consumers demand and from the way they are taking our offerings, we believe they are satisfied. I was late one morning getting in and found every space on the curb filled; turning my car, I started round the corner but was halted in the turning by customers who blocked the traffic until they seized my products and later followed me to pay for them.

"I take in from $12.50 to $19.00 each market day, and feel amply repaid for any work I may have done in helping to put the curb market on its feet. The market came out of the need of the country woman for a place to which she could bring her products for sale. She has neither the time nor the inclination to peddle them around the town. The county home demonstration council talked the matter over, called some town women in with whom it conferred, and after getting the consent of the city officials for the use of the curb, started business. It was not only the members of the home demonstration clubs of the county, but any farmers interested who were asked to bring their products for sale.

"Success has been beyond our most sanguine hopes and we are now wondering how we can arrange and where we can go when the cold, bad winter weather comes."

### A STALL IN THE CITY MARKET

Renting a stall in the city market is a more ambitious proceeding and the organization that runs it needs to carefully plan. There is the matter of stall rent, cost of scales, show cases, ice for refrigerator, etc., and the salary of a good person to act as salesman.

The Durham and Raleigh home demonstration markets have solved the expense question by taking an agreed upon per cent of all sales for defrayment and permitting those only who agree to abide by regulations to sell through the organization.

The responsibilty for operating the market and supplying products rests upon the county council of rural women and frequent are the consultations with the home agent and the marketing specialists.

### DURHAM COUNTY MARKET

Early in June a stall in the city market of Durham was opened with a county club woman in charge. Every woman's home demonstration club in the county sent produce and so far these women have been pleased with their sales.

Miss Rowe, home agent, was sent by the council to visit the State Horticulturist and the marketing specialist in the Department of Agriculture in Raleigh and obtained valuable data for standardizing products. She also visited the markets in Richmond to study arrangement, prices, etc., before opening the stall. The manager of the stall, herself a rural club woman, accompanied her on both of these trips. Miss Rowe says:

"I do feel that the establishing of this market has been our greatest work for the past year. At this time some families are depending on proceeds from this market to help supply the actual family needs. Not only has it aided in the family income, but I consider the educational value worth much more than the dollars and cents. It is easy to notice the decided improvement in the grading of vegetables brought to market.

The making and putting up of butter, the grading of eggs, etc., is carefully done. At the opening, butter with strong flavor and which was full of milk could easily be found, but not so now. I also feel that it is not an exaggeration to say that the cakes as a whole are 50 per cent better. Our beautifully dressed plump chickens will always sell. It means that our people are careful in keeping up the standards."

## ANSON COUNTY

The Anson County club women have established a very good market for all the canned products with the local grocerymen of the county. It has been a gradual growth from supplying a few dozen cans to each man to try to receiving orders at this date for practically all the surplus home canned products in the county. The home agent says:

"I had first to instruct the women in the standardization of a commercial pack and in business methods of disposing of these products. Second, there was the problem of convincing the merchant that we had a good, reliable article, and lastly, we had to appeal to the local people to call for and use home products.

"We did the advertising through public canning demonstrations; through appeals at club meetings; through presenting some of the best housewives with sample cans, soliciting their approval and asking that they speak a good word here and there; and also by guaranteeing every can. Much boosting was also done through the county paper. At this date the merchants give us fine orders, some of them do not buy any other brands as long as the 4-H brand can be had. They call us over 'phone when their supply is getting low. We still have on hand enough canned vegetables to keep our merchants supplied through March and April.

"We make a plan to visit each merchant at least once per month, looking after the supply, asking for any complaints, etc. Since September 1st, 1922, we have sold to our local merchants 270 dozen cans of soup mixture, beans and tomatoes. The prices are $2.75 for beans and $1.80 to $2.00 for tomatoes. We do not allow the club members to sell to a housewife at the same price she sells to a merchant. We also ask the merchant to make a display of the 4-H brand goods in his window as it comes on the market each year and we frequently supply fancy packs for this display.

"The home demonstration agent has always believed that the best and only way to induce the farmer's family to produce more gardens, poultry, and milk is to help him dispose of the surplus and to that end we have devoted a great deal of time. A visit was made five years ago to one of our state colleges for the purpose of learning just what products they bought in large quantities. The steward was very obliging, carrying us through his storage plant and showing us how the vegetables, fruits and jam were packed, labeled and crated. He opened some of the varieties that we might judge the quality and gave

us prices and all other information asked for. We told the women of our clubs about it on our return and suggested that Anson County could as well supply the college's need as a commercial concern. They were enthusiastic over the idea and I secured a trial order for vegetables and jams. The result was so satisfactory that we have continued supplying the college with certain products each year since. On November 5th, 1922, 848 pounds of blackberry jam was shipped to this institution. We also sold to the Greensboro College, 108 pounds.

"A year ago we asked about the poultry supply at the college. At that time hens were selling in Wadesboro at 12 1-2 cents to 15 cents per pound. We were told that the college used 300 pounds per week and would pay us 25 cents per pound plus express. Our club women immediately organized an association and they shipped coöperatively a barrel of hens every Friday for two and a half months, which brought in checks amounting to $517.00 During the month of November we have shipped 1,044 pounds of dressed turkey to the college at 40 cents per pound. We also shipped 193 pounds of turkey to the Greensboro College for Thanksgiving and 200 pounds to Pinehurst.

*"Parcel Post.* For three years the club women have been shipping dressed poultry by parcel post. This has grown steadily and the women now have regular customers who order from them as soon as the weather permits shipping. There are 40 members enrolled in the poultry association who ship by parcel post and 18 members who ship live poultry to Washington, D. C. Fig preserves, pickles, and jellies are sold to outside customers by parcel post."

| *Arts and Crafts* | | *Girls* | *Women* |
|---|---|---|---|
| Number club members enrolled in this project | | 3,050 | 3,138 |
| Number rugs made, value | $ 4,056.00 | 98 | 1,254 |
| Number counterpanes made, value | 16,562.00 | 8 | 1,266 |
| Number brooms made, value | 492.50 | ---- | 985 |
| Number chairs bottomed, value | 140.50 | 16 | 180 |
| Number baskets made, value | 11,794.00 | 4,228 | 3,635 |
| Number pieces furniture made | | 59 | 588 |
| Number pieces of furniture done over | | 425 | 2,422 |
| Other things | | 619 | 544 |
| How many demonstrations were successful in dyeing | | 40 | 1,267 |

## SOME STORIES OF HOW FARM WOMEN ARE TRYING TO BEAT THE BOLL-WEEVIL BY ADDING TO THE FAMILY INCOME

The agents in the eastern part of the State because of the advent of the boll-weevil have felt it necessary to lay emphasis on income earning features for the housewife, and many are the stories of what has been accomplished along this line.

The story of Mrs. Peele a club woman from Wayne County is interesting: "I live ten miles from town and have been a home demonstration club member for several years. After the arrival of the boll-weevil we heard so much about hard times that we almost decided to go to town, but we love country life and wish to raise our four children

to sturdy manhood and womanhood on the farm. Talking it over decided us to stick to the country and try our luck with small fruits, a good home orchard, a garden and chickens. I have always been able to dispose of my surplus canned products at a good profit, therefore, I planted more tomatoes, corn and okra for soup mixture as this is a top notch seller. We bought necessary pruning knives and spray material and gave our young orchard a good pruning and spraying. The trees for this orchard were purchased with premium money I won when I first began to can. I bought a pressure cooker, sanitary cans and a sealer and told my oldest daughter, 14 years of age, and her sister, 11, that they could have what they could make helping me can. My boy of eight was paid as general helper. The oldest girl also had a share in the poultry. As a result the girl and I won in premiums at the various fairs $194.00. I have sold $100.00 in one month of soup mixture and had calls for 15 dozen more. Of jams, jellies and pickles I sold $75.00 worth and still have 344 quarts of seventy varieties for home use.

"We have screened our canning shed and storage room which will make things easier by saving energy and time and with the increase from the orchard and small fruit patch another year we hope to still live on the farm in spite of the boll-weevil."

Cumberland County reports a club woman as having won in premiums $176.73 from pantry exhibits at fairs, while 26 club women won premiums in some other department. In fact, the secretary of the county fair appeared before the County Council and distributed checks amounting to $500.00.

One farmer and his wife won $400.00 in premiums at the State and county fair and, best of all, demonstrated to people how diversified farming could be done in his county.

The Greene County agent reports the happiness brought to a semi-invalid girl who was taught the art of making baskets and which she exhibits and sells through a local doctor's office.

A woman reports as much income derived from the sale of turkeys and pecans on the farm as anything else.

From Translyvania, a far mountain county, comes the following from the home agent: "I have engaged butter for many farm women with families in town and with Brevard Institute through the winter months. This institution will not take butter from any one until I have visited the home, approved the sanitary conditions and shown them how to pack the butter. This strengthens my work greatly. We have about twenty orders on hand now for rag rugs for summer tourists which will give my women employment for the long winter nights and help them make money for the necessities of life. One man in a mill village said, 'Miss Clarke, you are going to work my old lady to death. You got her so crazy on making up these rags you bring here. After she works hard all day she uses every spare minute dyeing the rags and *sets* up all night working them into rugs.'"

Forsyth County says: "One of our club women furnished twelve families in the city with fresh fruits, vegetables, milk, butter, cream and eggs. She tells me she sells to one customer as much as $60.00 worth some months, and averages $25.00 worth each month the year round. Another club member has four regular customers to whom she sells milk and vegetables. Another member furnishes all the brooms used by Salem College. This year she made 500 brooms at an average of sixty-five cents each. This woman has made and sold two dozen pairs of socks at sixty-five cents a pair."

*Clothing*

| | |
|---|---|
| Number counties reporting clothing work | 39 |
| Total number demonstrations in clothing work | 5,204 |
| Number dresses made | 25,129 |
| Number dresses repaired | 3,382 |
| Number dresses remodeled | 6,595 |
| Number visits made | 3,459 |
| Number dress skirts | 2,799 |
| Number dress accessories | 9,603 |
| Number demonstrations given in dressmaking | 1,650 |
| Number demonstrations given in plain sewing | 540 |
| Number undergarments made | 11,606 |
| Number dress forms made | 2,811 |
| Number demonstrations in selection of clothing | 445 |
| Number demonstrations following dress design instructions in line design and color | 1,929 |
| Number demonstrations given in millinery | 640 |
| Number hats made | 5,242 |
| Number hats trimmed | 3,109 |
| Number hats rebrushed | 1,642 |
| Number hats cleaned | 1,276 |

Clothing work was reported in 39 counties and dress design received particular attention. Both women's and girls' clubs decided on programs of work which gave them something of line, design and color. Live models were most popular and there were many volunteers from the rural audiences. The model was called to the front after the lecture and the audience would help prescribe the correct lines for her particular type, the agent or specialist guiding the discussion and asking reasons. Color and design were discussed and certain materials, hats, dresses, etc., were used on the model to show the effect. From arranging the hair, selecting and wearing the right type of hat, to suggestions for the comfortable and appropriate shoe, the model was planned for. She was given what the women call a prescription of proper lines for her type and samples of the colors and shades most becoming were pinned thereon.

It is fascinating to see a plain woman with uncompromising hair, dreary clothes, and a depressed attitude, develop into a pleased and attractive person simply by having her eyes opened to the right things to wear and the proper way of wearing them.

These methods of demonstrating dress design were used uniformly over the State, and that they are successful will be seen in the number of

dress schools held, the 3,262 demonstrations given and in the attendance. It is also noticeable in well dressed audiences of rural women and in the 130 club leaders who came to the girls' short course at Raleigh in June. I have never seen better or more tasteful dressing than these girls did. At the age when exaggerations were to be expected they delighted and surprised by their good taste and simplicity. From hair arrangement to low heel shoes, they showed the training they and their mothers had had in what to wear and how to wear it.

### Clothing Schools

The clothing specialist says: "I held short schools on clothing, especially in dress design, in eleven counties since January 1st. These schools lasted from two to three and sometimes four days. They usually covered by lecture and demonstration the following subjects: Study of the human figure and checking up on proportion; use and alteration of commercial patterns; making of the home-made dress form; line and design, and color. In these schools in which we had a longer time the actual cutting and fitting of a garment was given. In several other counties my work has been to outline and plan for the home agent that she may instruct her own women. With the help of one of the county home agents, outlines covering seven phases of clothing work were gotten out, thus assuring the counties, uniformity of work for girls and women. At the schools, instructions were given directly to 1,772 women and girls and they in turn acted as local demonstrators or leaders and taught others. I do not consider the increased number of dresses the most important result of this instruction. One man expressed it rather well when he said to me: 'My wife has just made the best looking dress—its' a jim-dandy—and the best part of it is that it *doesn't* look like it was made by loving hands at home.' "

The Bladen County agent made attractive posters advertising a two day millinery and three day clothing school. "Every club was asked to send a representative, two if possible, one to assume the responsibility for promoting and encouraging the interest in the millinery work in her community, the other to do the same for clothing work. At the end of the first 'millinery' day, the supply of millinery equipment was exhausted necessitating a trip at night to a nearby town and the opening of a store in order that more material might be purchased. The school was attended by 200 women."

The Alamance Home agent says: "In March the court room was converted into a work shop and a week was given to home millinery continuing the work done previously along this line. The women came in from town and county to make hats and to watch others make hats. To give millinery demonstrations in the county the home agent spends two days in each community and all-day meetings are held. At these meetings 425 hats were made. Fifty dress forms have been made

in 15 clubs and at the county fair, and dress design has been given in 12 clubs."

In Anson County four township clothing schools were held with 400 women attending.

Moore County reports that one little boy thanked the agent for teaching his sister how to make a dress form, as formerly he had to serve as a model when sister was away at school and mother wished to make her a dress.

Rockingham County reports the following subjects discussed and demonstrated: Importance of suitable clothes, test for textiles, colors and lines suitable for different types of figures; economy in buying and making over clothes. Eighteen dress forms and 479 dresses were made by 58 girls and 240 women. A four day millinery school was held and the women figured that they saved at least $550.00 as they made 110 hats.

The Franklin County agent reports as follows: "Millinery and clothing work has come to stay in Franklin County. It is impossible to hold a meeting of any kind without a request for help along this line. The popularity of the work is shown by the fact that 450 hats and 1,700 garments were made or remodeled, besides 500 dress accessories, at a total value of $4,300.00. At one club meeting a woman brought an old straw hat that was utterly hopeless. When I told her that it was impossible to do anything with it she said, 'Well, that means for me to stay at home all sumer for I can't buy one.' I told her to put the crown over a bucket and give the entire hat several coats of polish. She did this and the hat was stiffened, wired and re-shaped. She bought some pansies and we arranged these flat on the crown and with a bow on the side back, made of a ribbon that the woman had cleaned. The result was unbelievable and the woman was delighted. The total cost was seventy-five cents. This woman gets up earlier and works later on club days, but she never misses a meeting."

Halifax County has a new agent who reports one of her club members as saying, "If I had known that these clothing meetings were so interesting I would have come long ago."

The following comes from Miss Edwards, the Rowan County agent who is very skillful in clothing work: "These being subjects which I most enjoy, I have found great pleasure in demonstrating them. I have arranged clothing and millinery meetings according to seasons and have endeavored to give two successive demonstrations, especially in clothing. My plan follows: I write to all the club members and tell them I expect to have a two day clothing school and ask them to invite their friends. In the meantime I gather all of my illustrative material together. This consists of clothing for women, for girls and for little children. The day of the meeting we come together at 12 o'clock, eat dinner and get to work by 1:00 P. M. I talk to the women first about materials, what to use and how to buy, illustrating with samples given

me by the merchants. Then I take up lines. For this discussion I have some very interesting charts showing the effect, upon the appearance, of vertical and horizontal lines, using the silhouette of the same woman for five illustrations. Here I show different collars and their effect upon the figure, trying them on myself or on some woman in the audience. For this subject I try to have some dresses which show the effect of vertical lines on very slender women and horizontal lines on fat women.

"I next discuss design, showing how it is influenced by the material, the occasion and the personality of the wearer. Here I like to have costumes which are examples of good design worn by some of the women present when I can call attention to the good points in the costume. I secure these costumes by borrowing from my friends and using my own which illustrate my point. I seek dresses with good lines and little decoration. I harp on what Dr. Alvah Parsons said, 'When in doubt omit' and make it apply to trimming on clothes. I like to have good examples of girls' and children's clothes, for my audiences are always interested in these and also I like to show good examples of made over dresses.

"On the second day I take up patterns, showing the difference in patterns of different makes, then I ask the women to cut for themselves a plain lining by any one of my patterns and we have fitting demonstration. This is always valuable, for the women to begin to look at their own clotes more critically after seeing their neighbors in ill-fitting garments. They get an idea here about the selection of patterns. Following the pattern demonstration I take up finishes, discuss length of skirts and recall what was said the day before about lines. When it comes to collars, I like to have many models of collars that the women may find collars becoming to them and cut patterns for themselves. On the second day I put in color if possible if not I take the next club meeting for this subject, giving some theory and use colored material on women of different types showing the effect upon hair, eyes and complexion.

"The work in millinery has been the most popular work that I have done, but it has been mostly individual. In the early spring I arranged with the ten and twenty-five cent stores to handle a good line of hat frames, wire, braid and trimmings. For hat making, I aranged all day meetings. At the suggestions of the merchants I carried out a lot of frames and braid and let the club members select and make their hats. One merchant said that I was 'the best saleslady he had.' Usually about six women and girls work at a time, and in this way I am able to give them individual help, both as to design and construction. With the finishing up of six or more hats, enthusiasm runs high, and on the following Saturday a group of girls and women come into my office to make hats. I take parties of them shopping, and when they have purchased all supplies, they make their hats in my office. Certain girls

and women have been coming in each season for the past two years, for me to assist them.

"One woman, the wife of a member of the Board of Education, after much indecision, made a hat. The first Monday her husband, a very timid man, came into my office and said, 'I just tell you that my wife finished up that hat and wore it to church, and she looked the best she has looked in ten years.' Each time this man came to town during the spring season he purchased millinery supplies for the women and girls in his community, coming to me each time to select them. At the community fairs, I had a separate department for hats, and had some very attractive ones shown. These hats were made by women to whom I have taught millinery. I was much pleased to find the women and girls able to design and make their own hats."

*Home Improvement*

| | |
|---|---|
| How many counties doing home improvement work? | 9 |
| Household furnishings—How many demonstrators enrolled in project? | 101 |
| How many rooms have been rearranged? | 86 |
| How many floors were improved? | 43 |
| How many walls calcimined or papered? | 115 |
| How many kitchens have been rearranged for convenience? | 17 |
| Number of water systems installed | 174 |
| Number of lighting systems installed | 355 |
| Number of heating systems installed | 18 |
| Number of septic tanks installed | 269 |
| Number of homes improved by screening | 2,454 |
| Laundry—Number of demonstrators having an electric iron | 1,419 |
| Number of demonstrators having a washing machine | 1,929 |
| Number of home and school improvement campaigns held in 1922 | 9 |

*Improvement of Home Grounds*

| | |
|---|---|
| Number of demonstrators | 2,234 |
| Number of demonstrators planting grass for lawn | 535 |
| Number of demonstrators planting shrubs around the home | 972 |
| Number of demonstrators planting flowers around the home | 4,402 |
| Value of flowers sold | $2,364.50 |
| Number of demonstrators removing unsightly fences or buildings | 553 |
| Number of demonstrators planting according to a plan | 912 |

METHODS

Home improvement is taught through lectures and demonstrations at women's and girls' clubs, through demonstrations of actual furniture arrangement, etc., in individual homes, which serve as examples for the community; through county-wide campaigns in coöperation with the school teachers; through the demonstrations of club members who have had special instructions, and through the girl's annual short course, where girls are trained to act as local demonstrators or leaders.

At the State short course for girls held in Raleigh, when 130 were present, instructions in household furnishings were given on each of five days. The girls were taught to do over old furniture, and actually cleaned, painted and decorated with a neat stencil a table and four chairs, and turned out a most creditable job. They were taught some-

thing of harmony, balance and the use of colors, and were taken to a house furnishings department to give them a chance to show what they could do in applying what they had learned to actual selection.

The Franklin County home agent planned and carried out the first home and school improvement campaign ever held in North Carolina. After explaining in detail the coöperation of the schools and the plans, she says of her second campaign, held in 1922:

"Teachers and pupils write articles on the improvement made in their homes or rooms, thus correlating the work in English with club work; club women wrote papers which were read at club meetings. The best of these articles by the girls and women were printed in the county paper. The teachers told me that their pupils could scarcely wait for the paper, to see if one of their articles had been published that week. My column in the county paper was never so interesting or so widely read. The phases of the home and school improvement work that cost the least and meant more to the appearance of the homes were painting, foundation planting and doing over old furniture for the girls' rooms. One of my club officers herself painted her six-room home, interior and exterior, and paid for the paint with money realized from the sale of soup mixture. In another home, two children, 12 and 16 years of age, hauled rock in a wheelbarrow to build up the opening between the house and the ground. Not only did they pick up the rock and haul them, but they laid the stones themselves."

The Pasquotank home agent did good work in this line this year. One hundred girls and 200 women were enrolled in the Home Improvement campaign. The girls had for their project the arrangement and doing over of their own bedrooms. Two hundred and fifty rooms were rearranged, 400 floors improved, 350 walls calcimined, 150 kitchens rearranged, 5 water systems installed, 8 lighting systems, and 400 rooms screened. There were 300 demonstrators enrolled in yard improvement, 5 planted grass, 200 planted shrubs, and many of these were native shrubs that are so beautiful in Pasquotank County; 600 girls and women beautified their homes with flowers and 75 removed fences and delapidated buildings, making the service part of the yard to the rear. The home agent said that for a few years the people thought they could not have attractive yards on account of the cattle; but at last they are aroused to the possibilities, and several in each club are putting out shrubs, flowers and trees. The agent often carried her car full of plants from club to club, as her friends are glad to share their flowers. Plants and gardens are discussed in the meetings, and definite ideas as to the arrangement of the home grounds are taken home.

The following comes from Polk, a new mountain county: "Three homes have been screened. These were a little slow; in fact, so much so that I started the screening by personal example. In two homes, I screened a window each, and left the others to be completed by each family. The merchant in Columbus told me later that all of a sudden

many calls came for wire screening. Up to that time only a few yards had been sold. I believe from this little effort a campaign along this line next summer will be much helped. More people will screen because of a concrete example."

*Fairs*

| | |
|---|---|
| Number of community fairs held in North Carolina | 126 |
| Number of county fairs held in North Carolina | 36 |
| Number of State fairs held in North Carolina | 1 |

The home demonstration building at the State Fair housed a beautiful exhibit of canned products from each of forty-one counties.

The demonstrations carried on in the building were in nutrition, the preparation of food, jelly making, household conveniences, laundry work, arts and crafts (such as chair bottoming, rug making, etc., with exhibits of finished products), poultry work, dairy work, gardening, how to standardize products for market, bee culture, and clothing.

The live-at-home idea was running all through the teaching, and when a variety of vegetables from the home garden were shown in one booth, how to use them in a well balanced diet was demonstrated in another. The same idea was carried out in the poultry, eggs and butter shown in the poultry and dairy booths, and the nutrition booth demonstrated, also, the food value of these products.

A market stall such as any rural people might organize was equipped and filled with all kinds of table produce from the farm. Here the assistance of the Division of Markets was secured, and green vegetables were properly arranged and placed, potatoes and eggs graded, butter put in proper cartons, and standards for all other products shown. Some statistics of successful markets were displayed on placards, and two home agents were in the booth to explain and instruct. One woman who made a specialty of her orange marmalade demonstrated the excellence of her product, and took orders from the public.

Carrying out the income earning features, really beautiful home-made rugs of soft colors were shown. Baskets, brooms, chairs bottomed with shucks, knitted counterpanes, all made by club women, were displayed, and sold for satisfactory prices.

Teams of girls and boys were brought down to the State Fair, chaperoned by the home and farm agents, and gave demonstrations in poultry judging and proper housing and feeding. These teams gave, also, demonstrations in seed selection, how to recognize plant diseases and the remedy, stock judging, etc. Most of these contests are to be housed in the home demonstration building in 1923.

Twenty-four home agents assisted in carrying out the State Fair program. Two to a booth, they gave the demonstrations to big audiences each day, and did much to advertise home demonstration work and what it might be worth to a county.

## Community Fairs

One of the district agent says: "When it comes to arousing community interest and pride, there is nothing which will accomplish this more thoroughly than the community fair." At these fairs, all of the judging is done in the open. The people are interested in knowing why decisions are made, and as only women trained in judging are asked to act, it is not hard to give reasons. Score cards are used in all judging, and as the poorer products are eliminated, the audience gathers close to note the scoring from point to point. A clear explanation never fails to satisfy many an exhibitor, who goes back with a knowledge that brings her to the fair a prize winner next year.

The following comes from the Rowan home agent: "The organization of community fairs began with a fair association which was composed of one woman and one woman from each township. This association met four times, drew up a set of rules, divided the county up into fair districts, and decided upon locations for four community fairs. The people of these communities met and organized, worked out details, raised funds and put on very successful fairs. The exhibits were very good, both as to variety and quality. Mr. Yeager, farm agent, and I assisted with organization, secured an appropriation from the County Board of Commissioners to cover about one-fourth of the premium list, and, with a few suggestions as to the management of the fairs and arrangement of exhibits, left the communities to their own initiative. We were much pleased with the spirit of coöperation and the successful management of the fairs. I sent each woman who had charge of a department a circular letter, making suggestions as to the arrangement and decoration of her department, and was much pleased to find these suggestions followed very carefully, and when the hour for the opening of the fair arrived, everything was in place, with the department managers at their posts, exhibiting an air of satisfaction which indicated a successful accomplishment of what they had undertaken to do.

"The spirit of community pride and of coöperation was very noticeable. China Grove, a small town, held its first fair. The mayor of the village was made president, and he gave attention to the minutest detail, seeing that every plan was carried out successfully. The managers were made up of town men and farmers, members of the women's club and farm women. Every one of them worked very earnestly for the success of the fair. Perhaps the most outstanding exhibit in the woman's department was an exhibit of fifty baskets and trays made of reed, the direct product of the girls' short course in Raleigh. Two girls from the China Grove district learned basketry at the short course and gave demonstrations in their community, resulting in an exhibit at the fair. This exhibit attracted much attention, and these girls and members of their families have been giving demonstrations in other communities."

## ANNUAL SHORT COURSE FOR GIRLS

The short course for the girl club leaders is held for two weeks each year. Peace Institute, Raleigh, has opened its doors to the girls for the last year, and this year it housed the annual school for agents as well.

Each county was asken to send as many of the club girls to the short course as it could finance, and 130 entrants were the response. In some instances, prize winners in poultry work, cookery, canning and home improvement had their expenses paid by civic clubs, banks or interested individuals, and in many cases the trips were financed by the county demonstration councils. Bladen, Columbus and Stanly each sent 15 girls, and Cumberland and Davidson sent 12 each. The county school superintendent of Stanly County drove the agent and club girls to Raleigh in the school truck, a distance of 123 miles.

Since the annual short course is to be in the nature of a reward for club work well done, as well as to fit the girls for leadership, the idea is to give them class work in the morning, and in the afternoon send them on trips around the Capital City and to its many interesting institutions. The evenings are given over to recreational features.

The program of work for 1922 included: How to prepare and serve a meal, jelly making, how to do over old furniture, household furnishings, and basketry.

The assistant state agent says: "It is gratifying to get reports from our little club girls such as this: 'I have taught some of our club girls how to make these baskets, and next meeting I am planning to carry a table and show them how to fix over old furniture and make it look new. I am sure we will do our part in showing the other club girls what we learned while we were at Raleigh.' One agent writes: 'The parents of the girls were as much delighted as the girls themselves. I think the fact that the children had something to carry back to show made a most favorable impression. One father said he had never spent the same amount of money when he felt he had gotten such returns.' Another club girl writes: 'I have written to the different places to get the material to make some baskets. Nearly everybody that has seen my basket wants me to make them one. I am going to make one dozen and send them to the fair for Mrs. Morris to sell for me.' "

## ENCAMPMENTS

Encampments for club girls and boys were held in 24 counties, and were conducted by the home and farm agents jointly.

One agent says of her camp, which was a typical one: "I consider the boys' and girls' camp the most effective and far-reaching piece of work done in the county this year. The associations, along with the recreation, demonstrations and instructions carried on at this time put demonstration work on a solid foundation and made every one of those boys and girls hail club work as his or her greatest opportunity."

The Alamance agents transported 62 boys and girls 198 miles in school trucks to the high mountains of North Carolina, as many of these children had never been beyond the hills of their own county. Many of the eastern counties chose the sea coast or the shores of a lake as a camping place.

The account of the Sampson County encampment will give an idea of the conduct of these camps: "The Boys' and Girls' Club Encampment held at White Lake last week was the biggest and most successful one ever held for Sampson County. There were 219 boys and girls registered for the full time, and those who came for a part of the time ran the total attendance up to 250 or more. This is an increase of 75 over last year's total attendance, and is worthy of note, as entrance requirements were more rigid than they were last year. Every club in the county (12) was represented except Oakhurst and Mingo Academy.

"The first day's program consisted chiefly in getting to White Lake and pitching camp, but all members were registered and assigned to rooms and tents, and all food was stored in the commissary in time for the first swim in the lake at 4:30 p. m. The regular evening program for Tuesday had to be postponed on account of rain, but the boys and girls crowded into one building and enjoyed a very entertaining social hour.

"The rising bugle was supposed to be sounded at 6:00 a. m., but at 5:30 Wednesday morning there was a buzzing noise coming from every quarter, which showed that Sampson County boys and girls are early risers, so we moved up our rising hour to 5:30. The children came out shivering at first in bathing suits which had not dried during the night, but it required only a few minutes of setting-up exercises under the direction of camp commanders to warm them up for the morning swim. During the period each morning Dr. Hollingsworth gave demonstrations in resuscitating a drowning person.

The meals were served cafeteria style, and it was an interesting sight to watch this crowd line up by clubs, march by the table to be served, and march on to the rude seats in our open-air auditorium, which also served as a mess hall. Immediately after breakfast, dishes were washed, a squad of boys from each club was detailed to clean up the camp under the direction of the officers of the day, and get things in order for devotional exercises at 9:40.

"There were two instruction periods each day, when the boys and girls were taught how to candle and grade eggs, how to identify plants, and how to do certain arts and crafts work. In the egg grading contest all of the winning clubs made scores of 90 and above, the first making 98.3.

"In the plant identification contest, the children were taught not only to recognize various plants, but to know their relative importance, as well.

"There was ample time for recreation, two and one-half periods during the day, when the boys had baseball practice, and all who did not play baseball had games, story telling and swimming lessons. We had a very interesting program Wednesday night, beginning with a short address by Frank Peterson, the boy president of the county club. Reports were heard from members who had done club work at the State Fair and elsewhere since the last encampment, and there were talks by officers of local clubs, songs and yells, etc. Thursday night was stunt night. Friday afternoon we had a match game of baseball between the Sampson and Bladen county clubs, when Bladen won.

"The behavior of the club members during the week was excellent. The discipline was a marvel to the visitors when they saw such a large number of boys and girls assembled from all over the county. It was made possible by the excellent assistance of the local leaders of the various clubs, who deserve the credit for the success of the encampment."

COUNTY-WIDE CAMPAIGNS

| | |
|---|---|
| Number of county campaigns held in 1922 | 225 |
| Number of bread campaigns held in 1922 | 35 |
| Number of garden campaigns held in 1922 | 29 |
| Number of home and school improvement | 9 |
| Number houskeepers' week | 1 |
| Number school lunch | 15 |
| Number home conveniences | 15 |
| Number county rallies or picnics | 67 |
| Number beautification of premises | 12 |
| Number dairy | 3 |
| Number grape products | 10 |
| Number others | 14 |
| Number counties promoting the "Live at Home" Campaign | 47 |

Every county organized in home demonstration work is asked to put on at least one county-wide campaign during the year, that every part of the county may be reached with home enconomics instruction. The milk for health, the better bread and school lunch campaigns have been reported under Nutrition, Home and School Improvement, and Beautification of premises under Home Improvement, and the Live at Home campaigns under Gardens, Poultry and Dairy Work.

Another interesting campaign was that put on in the eastern counties, where the muscadine grape is abundant and where the people are calling for instruction in conserving the great crop.

Campaigns were put on in Moore, Lee and Scotland counties, and group meetings were held in three or four communities in each county, where demonstrations were given in making cold pressed juice, grape paste, jelly stock and jelly. The women receiving instruction put on excellent exhibits of grape products at the community, county and state fairs, and the sale of muscadine jelly has become a means of adding to the family income.

COUNTY COUNCILS

| | |
|---|---|
| Number of counties having home demonstration councils | 35 |
| Membership | 1,967 |

When a county is organized in home demonstration work, the agent is urged to bring together a council of women composed of representatives from each club or community. These women act as an advisory board and meet with the agent once a month, or sometimes at longer intervals, to give reports of how the work is going and to help plan for further work. They appear before the board when appropriations are to be asked for, and they come to answer any complaints of the work that may be brought to the boards.

Occasionally, the council asks the board of education and the county commissioners to lunch with it in the office of the home demonstration agent, which is, in almost every case, in the courthouse. At this time certain plans are discussed and reports of what has been done are given. The visitors are fed some of the dishes the women have been taught to prepare, and members of the boards get at first hand an important phase of home demonstration work.

In Northampton County an advanced girls' club, which had studied balanced meals and table service, served the commissioners and Board of Education at a special meeting. Miss McLawhorn, home agent, says in regard to this meeting: "We baked the cakes the day before the meeting, and cooked the chicken in the steam pressure cooker. The girls made the dessert to go with the cake, and decorated the table. The menu consisted of chicken soup, chicken croquettes, ham, pickle, creamed peas, potatoes, hot biscuit and butter, tomato salad on lettuce, and peach Bavarian cream with cake, mints and coffee. The preparation of this dinner was the best lesson in foods this club ever had, and certainly showed the boards the resourcefulness of club members who could serve sixteen in an office with such inadequate equipment."

The council backs the club and stall markets, backs the girl's club work, and its individual members are demonstrators of the agents' teaching in their own communities.

The girls are asking to have a council of their own, and several counties will try it in 1923.

The Hertford home agent says: "I remember distinctly the first meeting of the county council. One woman from a community that was listless pledged herself to go home and arouse interest from this big home work. She certainly succeeded, for today this backward community is so alive that they have changed the name from Mill Neck to Christian Harbor. Other sections have been awakened by the same influence, and today the demonstration agent has a hearty welcome to almost every section of the county. During the year, the roads have been so hard to travel that the county council of women have found it hard to come to the county seat to regular meetings. In consequence, I have been going from section to section in my car to get them

together, carrying them to some central point in the county or a discussion. There is, however, one big business and social meeting which alawys falls on the first Monday in December, when all members assemble at the county seat as guests of the home demonstration agent. Plans are made for the year's work, and they are on hand to appear before the Board of County Commissioners to push the appropriation through."

The Franklin agent says: "My county council and town advisory council met Friday. It was open to the public, though I did not spend any time advertising it. We had reports from most of the clubs of the county, and short talks by the members. I felt so proud of those girls and women who stood up and talked! Four years ago they would have fallen if I had insisted on their talking in public. We had nearly 200 present. Miss Bordeaux, the new agent, has a fine type of women to support her."

### STATE FEDERATION OF HOME DEMONSTRATION CLUBS—CALLED THE STATE HOME BUREAU

Finding the county federation of clubs represented by the county councils so helpful in advancing home demonstration work, the councils thought it wise to form a state federation of home demonstration clubs, which should have its annual meeting at the State College, Raleigh, when the Farmers' and Farm Women's Convention meets. A preliminary meeting was held at the college in August, 1920, and in 1921 delegates came from 14 counties which had decided to federate. In 1922, regularly appointed delegates came from 32 counties, 128 in number, and interested club members came with them. There were in all 250 people attending.

Most inspiring reports were given of how home demonstration work was conducted and the results obtained, and the spirit of the meeting was remarkable.

### AFFILIATION WITH STATE FEDERATION OF WOMAN'S CLUBS

At the 1921 August meeting of the Home Bureau, it was decided to affiliate with the State Federation of Woman's Clubs, and to that end a committee was appointed, with the State home demonstration agent as chairman, to meet the Federation Council and talk over plans for the proper affiliation of these large organizations.

Plans were worked out which were later unanimously adopted by both organizations.

### COOPERATION WITH OTHER ORGANIZATIONS

In 1922, the Division of Home Demonstration Work planned to do definite work with the State Departments of Health and Education and with the following departments of the Division of Extension Work—Animal Industry, Horticulture, Division of Markets, and the Farm Demonstration Work. The State Home Agent conferred with all

heads and after policies were determined, plans were outlined for county work.

### Cooperation With State Department of Health

In the Department of Health, work was planned with the Bureau of Maternity and Infant Hygiene and with the public health nurses. These agencies are glad to work with the well organized piece of machinery the women's and girls' clubs have grown to be, and the county agent is asked to arrange definite times and places and to fit the health program into her plan of work.

### Cooperation With Department of Education

The coöperative plans between State Home Demonstration Agent and office of State Superintendent of Public Instruction embrace negro work, the beautification of school grounds, and a proper understanding of the relations between Smith-Lever and Smith-Hughes work.

The head of the home economics vocational work and the State Home Demonstration Agent have agreed upon a policy for the employment of agents and teachers and have conferred frequently regarding applicants for positions. They have talked over their separate fields and agreed that home demonstration work shall have the instruction of rural girls and women outside of the school room and Smith-Hughes inside. Smith-Hughes conducts special classes for women in large villages and towns and Smith-Lever organizes them into home demonstration clubs in the smaller places.

The following story from Craven County is a good example of the coöperation of educational and other forces with home demonstration work: Craven County which has been organized in home demonstration work only two months, through its home agent, arranged with the county board of education to use the school trucks to transport sixty club girls and women to the Farm Women's Convention in Raleigh, 120 miles away. The home agent says: "The County Superintendent of Education was the best coöperator any one could wish. The trucks were ours and the board of education gave me a letter of credit for $100 to pay for gas, oil, and any repairs.

"The County Board of Agriculture gave me another $100 bill to pay for the meals of the girls and drivers while we were in Raleigh. The County Welfare Officer, a woman who has given us fine coöperation, went to chaperon one of the five trucks and the mothers and I chaperoned the others."

### Cooperation With Division of Animal Industry

Coöperation with the Division of Animal Industry was in poultry work, through poultry specialist; home dairy, dairy specialist; milk for health campaigns; the livestock meeting, and the joint preparation of a bulletin on Pork on the Farm.

### COOPERATION WITH DIVISION OF HORTICULTURE

Coöperation with the Division of Horticulture was through a joint garden project. Arrangements were made for getting the best results from the garden and farm beautification specialist by well planned meetings of home demonstration clubs and through the use of garden bulletins from the Division of Horticulture.

### COOPERATION WITH DIVISION OF MARKETS

Coöperation with the Division of Markets was through instruction in grading and market standards to county councils by specialists and through their assistance in organizing curb and club markets.

### COOPERATION WITH FARM DEMONSTRATION WORK

Plans for coöperation between the Division of Home Demonstration Work and Farm Demonstration Work were made after a conference of the State Home Agent, the Director, Assistant Director, and State Farm Agent. A committee was appointed to arrange coöperative projects. The following were planned for: Boys' and girls' club work, encampments, county and community fairs, community clubs, poultry work, county campaigns, and work in unorganized counties. Farm and home agents are to meet at State College, December 10th, to definitely decide on their coöperative projects for 1923.

### COOPERATION WITH THE GOVERNOR OF THE STATE

The Governor of the State is much interested in a campaign to induce each farm to feed itself, and to that end he called in for consultation the different State departments which might help in its inauguration. The Department of Agriculture and the Agricultural College were represented by Director Kilgore, President Riddick of the College, the Dean of Agriculture, and the State Home Demonstration Agent; Education, by the State Superintendent of Education and the head of Vocational Work in agriculture; Health, by the Secretary of the State Board. These heads met and talked over ways and means and appointed a committee with the State Home Demonstration Agent as chairman to draw up plans which should engage the efforts of all the State departments represented.

Results of this campaign will be seen under gardens, poultry, and dairy projects.

### PROGRAM OF DETERMINATION

To plan programs for the year the district agents were called to the head office in November and there we talked over and planned outlines to submit to county agents that they might have ready their plans for the January meeting of the staff. Every agent submitted a plan. How well they are carried out will be seen by the country-pro-

gress reports. Very few counties could carry out a uniform program for every community. There was the question of first year work, intermediate and advanced work to be planned for, but the plans for each type were in most of the counties practially the same.

### Maintenance and Training of Personnel

Very definite plans are made for the installation of a home agent in her territory. District agents announce the time of arrival to the local county council, and, if there is one, to the woman's club, and to the church people. The farm agent is notified and also the county superintendent of education. If possible, the district agent is at the county seat to welcome the agent and to get her well established in a comfortable home, realizing that to do efficient work, an agent must be happy in her home life. The county superintendent of education and the farm agent are visited next day and coöperative plans for work are talked over. The agent's office is usually in the court house, 44 of the 53 agents being so housed. As early as possible, the home agent is introduced to the county commissioners and to the board of education. Arrangements are made about a car, and the assistance of the farm agent and the school supervisor secured in pointing out roads and club centers. Cars are owned by the Division of Home Demonstration Work in 45 counties.

Where it is possible to get a new agent two to four weeks before the old one leaves, I have found it a good plan to apprentice the new agent for that length of time to an experienced agent, where she can learn organization and methods.

### Annual School for Agents

The annual school and conference for agents is the most important means of training agents. Every agent is required to attend, and for ten days of instruction she is a hard worked individual. Each year special phases of home economics are stressed, and the best specialists to be had are employed as instructors. This year the major subjects were dress design and nutrition, and Miss Mary Brown, of Pratt Institute, was employed to give the one, and Dr. Halverson, nutrition specialist of the N. C. Extension Service, the other. At the annual school for agents it is at the hour and a half conference period each day that administration and organization problems are discussed, and it is there that the agents get inspiration by hearing the results of each agent's work. A certain time each day is set aside for the state agent's conferences with individual agents. It is then that she can get close to the worker in her plans and aspirations and learn to know her personally as well as professionally.

The following schedule was carried out at the school for agents: Dress design—Three hours lecture and laboratory work. Nutrition—Two periods of instruction, three hours each, consisting of lectures

and a visit to Dr. Halverson's laboratory to see the effect of feeding on white rats; special work in conservation of foods, two periods of two hours each; the art of demonstrating, three periods, one hour each; Special lectures at night—Organization of Federation of Home Demonstration clubs; Live at Home campaign; publicity; coöperation of farm and home agents, home gardening, coöperation with Bureau of Maternity and Infancy Hygiene. Conference period one and one-half hours each day.

### SPECIALISTS

The Division of Home Demonstration Work coöperates with the Division of Farm Demonstration Work in the use of poultry, dairy and gardening specialists and in the services of the nutrition specialists, Dr. Halverson, who is ours for consultation and who can be called upon for investigations and lectures, but does not visit in the field.

We have found the arrangements with these specialists most satisfactory and the training of the men exceptional. For specialists in other home economics lines we are using the assistant state agent and the district agents, who serve in a double capacity. The assistant state agent is clothing specialist; the Piedmont District agent, specialist in household furnishings; the Central District agent, in foods; the Tidewater District agent, in marketing, and the Eastern District agent, in organization and recreation.

North Carolina is a state of 100 counties, and one specialist would be so thinly spread that our policy is to have the agents get intensive training in the subjects they are expected to teach. Having them thus fortified, the specialist finds it easy to multiply herself through the well prepared agents. It is here that the special work in the annual school for agents is telling.

### PUBLICITY

Twenty-eight home agents have regularly set aside corners in the local papers, and 39 tell of their work either in the corners or in allotted space. Forty-six of them give timely recipes and instructions, and 14 use stereopticon or motion pictures as a means of publicity.

The State Agent's office has no difficulty in getting publicity for home demonstration work. Correspondents from the "News and Observer," the "Greensboro News," and the "Raleigh Times" visit the office regularly and give home demonstration work prominent space in their columns. Representatives from each of these papers came to the June School, the Girls' Short Course and Farm Women's Convention held in Raleigh and gave daily write-ups. The other big State papers have published material which has been sent them, advertising meetings to be held and also accounts of those meetings, and they have frequently petitioned for stories of work accomplished. The district agents' monthly resumes of the work have been sent to papers in their districts and have been gladly received and published. The Extension Division

of Publication syndicates articles from the State Home Agent and others on timely subjects which most of the State papers print. These articles are sent also to the home agents in the counties with the request that she put them in the county paper. From the number of papers using the copy, it would seem that the articles have been successful.

The following from Anson County will show how a county agent conducts her publicity. "For four years the home demonstration agent has conducted a corner in the county paper. We first named it 'In and about the Home', but later changed it to 'The Women's Corner'. The editors have been very loyal to the agent and never fail to get the material in. The women of the county look on the Corner as their special page in the paper, and very often write the agent their appreciation of it. They also ask that special recipes be printed. We have had requests from Georgia, Virginia and South Carolina for recipes that had been printed when the writers lost the clippings. In conducting this department the object is primarily to foster and to promote the home demonstration work. In doing this we find that the articles must be timely, but must be varied and must appeal to the interest of as many different people as possible. We have adopted the practice of reporting the club meetings, bringing in the names of the club members. Often I weave in a human interest story, telling the humorous as well as the practical side of the work. Figures and details are occasionally given, boosting the marketing of country produce. Products marketed by parcel post are published and names of producer and consumer given. Sometimes we top it off with a bit of poetry, occasionally we include games and contests for the young folks, and always I add one recipe for seasonable dishes. We take up the canning of fruits and vegetables as they come on, usually getting the recipes in the week before. For instance we give a half column on strawberries, peaches, pickles, or 'What to do with peas', grapes or green tomatoes, as the case may be. Nutrition articles are printed also and good articles gotten out by the State Department. I passed an old man not long ago on the street who called to me and said—'Mrs. Redfearn, I just want to tell you that I read your piece every week. I am too old now to get out much, but it makes me feel like I'm right with the folks you're talking about, and sometimes I read it over twice' ".

## NEW COUNTIES

Between March and June 1922 the county commissioners and the boards of education in four new counties, Scotland, Craven, Wilkes and Polk appropriated for the employment of a home agent, and between June and December, Chowan, Bertie, Edgecombe and Jackson appropriated. All of these counties were supplied with agents except Bertie, where an agent begins work January the first.

During the year one county, Stanly, dropped the work.

### CHANGES IN AGENTS

Agents resigned in Buncombe, Columbus, Guilford, Halifax, Northampton, Onslow, Pender and Mecklenburg. Five of these agents resigned on account of marriage, one because of ill health, and two we thought better adapted to the school room than to the field.

The former Moore County home agent was transferred to Mecklenburg and the former Nash Agent to Scotland.

### MOUNTAIN COUNTIES

Because the mountain district had in January only three organized counties, it was planned to increase the number if possible to six counties in 1922.

To create interest and to give publicity to what home demonstration work can mean to the mountain home, it was arranged to have the assistant State home agent, three district agents, and good field agent secured from Converse College, to go to unorganized mountain counties to do intensive work for one month each in the summer. Two of the counties are remote from railroads and all are virgin ground so far as home demonstration work is concerned. Plans were made for demonstrations in the preparation of food, the making and use of a fireless cooker; and lectures and demonstration work in health, hygiene, nutrition, and household management.

Each agent carried a simple equipment packed in a suitcase with an oil stove in addition. Plans arranging for meetings on definite days and in definite places were made with farm agent in five counties and also with county superintendent of education. These agents received the finest coöperation from editors and organizations in the county seat. As a result Jackson County appropriated $3,100 as its part of the cost of home demonstration work and Burke and Watauga express a desire to come in next spring.

### STATE AGENT'S STATISTICS

Miles traveled, 6,020; meetings attended, 102; attendance, 24,785; agents visited, 21; other trips, 15; letters, 1,729; circular letters, 1,678; conferences, 832; articles, 30.

### ASSISTANT STATE AGENT'S STATISTICS

Miles traveled, 10,496; meetings attended 211; attendance, 16,227; agents visited, 48; letters, 596; circular letters, 2,088; bulletins, 2,899; conferences, 1,173; articles, 7.

### COUNTY AGENT'S STATISTICS

Miles traveled, 307,034; meetings attended, 11,167; attendance, 415,060; letters, 17,599; conferences, 47,639.

### DISTRICT AGENTS' STATISTICS

Miles traveled, 43,911; meetings attended, 623; attendance, 91,797; visits to agents, 222; letters, 3,755; circulars, 3,491; bulletins, 2,841; conferences 3,079; articles, 107.

### WORK FOR NEGROES

Home demonstration work for negroes was begun in February, 1922, and would have started earlier had it been possible to secure well trained negro women for agents.

There are at present six counties organized with a whole time agent in Wake, Wayne, Anson, Beaufort, Johnston and Columbus. Agents in these counties are assistants to the white home demonstration agent and the work is carried on through clubs for negro women and girls in selected rural communities. On the whole, results accomplished are satis factory.

Anson and Beaufort counties began work in February and March, Wayne, Wake and Columbus in June and July, and Johnston in October. A part-time agent did work for two months in Moore.

The following report will serve to show the methods used in reaching the colored people: Emma McDougald began work in Wayne County on the 15th of May and now has 14 women's clubs with an enrollment of 235, and 2 girls' clubs with 20 members. These were organized through visiting the churches on Sunday where she presented the work and through visits to individuals. The story of her work in her own words is here told:

"I took the work in Wayne County the second of May, 1922. The task seemed too much for me and if I have done anything it has been through the Lord and good friends. Mrs. Smith, district agent, and Miss Bogle and Miss McEachern, county agents, have been wonderful help to me.

"May is a very busy month for farmers, made doubly so in this county because lots of the farmers are truckers. Then hail storms ruined the farms in some places and the second planting was necessary. Next, heavy rains drowned some parts of their farms and on other parts of it the grass was playing hide and seek with the women and children.

"When I started work most of the schools had closed and my only opportunity to see the people was to meet them at their churches. I did this when I could and found a very warm welcome. In most cases the women were a little wary about joining an organization, but soon they saw the point and only once did I fail to get my clubs. I did not let them go but got them by visiting them at home and talking it over.

"Meeting the people at their churches was all right, but it was every seventh day and my work was moving too slowly, so I went out in the fields and everywhere that I could get a woman or family to listen to me. They generally listened and gave me their names. By December 1st

I had 14 women's clubs with 235 members and 2 girls clubs with 20 members. I have not tried to form any more clubs as these are about all I can look after. I do a good bit of walking and then I hope to do some more work with the schools. I have missed two engagements because the men I had hired to take me did not come.

"The following are the demonstrations which I have been able to give: Canning, balanced meals, bread making, clothing, care of clothes, and gardening.

"The gardens are very poor so I am begging the people everywhere I go to plant fall and winter gardens. I am glad some of these are growing beautifully. I name a number of vegetables which may be planted at the time. The men and women promise to do what they can with these gardens now and next spring to have better gardens with a greater variety of vegetables.

"I give health talks about infants, children and grownups. Miss McEachern gave me a lot of literature along this line and I give it to individuals, especially to mid-wives and mothers. When I get the right kind of bulletins, I leave some of them in churches by permission. The people seem very glad to have them and the women are very glad of the cook books and child feeding books. I talk and demonstrate good bread everywhere I go.

"I was able through Rev. McLeod to get about 35 people to take the vaccination for the prevention of typhoid, and got the county nurse to go with one of the city nurses to see a white woman in the county whom I considered very sick.

"I talk home getting and self respect to the men and schools and self respect to the young folks. I am glad to help any one I can. The greatest good to the greatest number is my motto."

The Wake County assistant presents the following outline of her food work:

Milk as a food,
Food for children,
How to prepare left overs,
Ways of using corn meal,
Preparation of vegetables for the table,
Cheese and butter making,
Protection of food from { flies, molds, dust.

## FAIRS

The negro home agent in coöperation with the negro farm agen promoted and helped to organize 10 community fairs for their people and assisted at the negro state fair.

## STATISTICS OF NEGRO HOME DEMONSTRATION WORK

| | |
|---|---|
| Number girls clubs | 61 |
| Enrollment | 1,904 |
| Number women's clubs | 62 |
| Enrollment | 1,904 |
| Number community clubs | 27 |
| Enrollment | 1,546 |
| Total enrollment | 5,354 |
| Number club meetings | 294 |
| Number other meetings such as church, etc. | 38 |
| Total meetings | 332 |
| Attendance | 1,476 |
| Miles traveled | 6,535 |
| Homes visited | 1,178 |
| Schools visited | 75 |
| Conferences | 194 |
| Letters | 643 |
| Days in field | 551 |
| Days in office | 116 |
| Number demonstrations in clothing | 84 |
| Number club members enrolled in food work | 1,052 |
| Number demonstrations in canning | 602 |
| Number quarts vegetables and fruits canned | 20,663 |
| Value | $5,165.00 |
| Number quarts preserves, jelelies and jams | 3,075 |
| Value | $2,460.00 |
| Number quarts pickles, relishes and catsup | 2,264 |
| Value | $1,132.00 |
| Number quarts vinegar | 132 |
| Value | $ 13.20 |
| Number quarts juices | 301 |
| Value | $ 45.15 |

JANE S. MCKIMMON, *State Agent.*

# DIVISION OF FOOD AND OIL INSPECTION

The work is authorized by the following inspection laws: Pure food, bleached flour labeling, sanitary creamery, ice cream and cheese factory, sanitary bakery, sanitary bottling plant, linseed oil, illuminating oil and gasoline.

The food law forbids the manufacture or sale of adulterated or misbranded food or beverages, but carries no funds for its enforcement and its enforcement, if at all, must be by use of funds provided for other purposes.

The bleached flour law requires all flour that is artificially bleached to be labeled bleached so that the fact that it is bleached will be made known to the purchaser.

The linseed oil inspection law requires all linseed oil or oils used as substitutes for linseed oil to be plainly labeled what they are so that a purchaser may know what he is buying, and the law establishes a standard for linseed oil.

The illuminating oil law established a standard for such oil based on its illuminating power and its safety when used for illuminating purposes.

The gasoline law establishes a standard of quality for gasoline and prevents the fraudulent sale of gasoline of poor quality as high grade gasoline. When gasoline is purchased in North Carolina the purchaser knows that he is getting a good grade of gasoline that is not adulterated.

The above laws, except the pure food law, all carry inspection taxes for their enforcement.

The work of the food law is conducted along with and by the force conducting the work under the other inspection laws, but, of course, cannot have the attention as if funds for the purpose were provided.

During the two years, 1,265 samples of food and beverages have been examined which samples were collected in general inspections throughout the State and were confined largely to those products in which adulteration or misbranding is suspected. While some very positive adulteration was found, most of the trouble consisted of misleading statements and misrepresentations of a minor nature on the labels of food packages.

The bleached flour law is being reasonably well complied with though it is necessary to keep watch on the situation. 870 brands of bleached flour have been inspected.

The sanitary bottling plant law also been reasonably well complied with. 410 inspections of bottling plants have been made. The enforcement of this law has in the past few years raised the bottling business to a much higher plaine and it is rapidly becoming one of the leading

industries of the State. Most of the plants in the State are operated in a sanitary, high class way and the products put out are wholesome.

The sanitary bakery law is a new law. We knew something of the condition of the bakeries before the law was passed, but on better knowledge of them we have actually been horrified at the condition of many bakeries where bread is made for human consumption. Many are operated in dark, dirty places, not ventilated, and because of bad floors, walls, etc. they are open to rats and all kinds of vermin. Much of their equipment and supplies are exposed to rats, flies and other dangerous vermin. Such places cannot be made suitable for a bakery and our efforts are to get them out of such places and into suitable ones. Two such places have been closed and forbidden to be used as bakeries. Others have been advised that they must have better quarters. All such places must improve their conditions or be closed up. We try to get local authorities to aid us in this work. 248 inspections have been made.

Because of their insanitary condition comparatively few of the bakeries in the State would be acceptable as members of the American Bakers' Association. While the above is true of many bakeries in the State, there are others in splendid condition and are operated in a high class, sanitary way.

The sanitary ice cream plant and creamery inspection law is also a new law. Most of the large plants are in good condition but some of the smaller ones, especially some of those operated by foreigners, are in bad condition and two were closed up. Others were notified that they must, as promptly as practical, secure better quarters, that their places were not such as could meet the requirements. 280 inspections have been made of these plants.

The illuminating oil law has been well complied with, except in a few cases where gasoline became accidentally mixed with the oil which rendered it dangerous. In a few cases we discovered that gasoline had become mixed with the oil. We wired the sale stopped before any damage was done. In another case, the oil became accidentally contaminated with gasoline after it had been tested and the oil caused an explosion. With oil and gasoline handled by the same tank wagons there is great danger of the mixing of the two. During the two years 5,834 samples of oil were examined.

The gasoline law has been reasonably well complied with, but it has at times required close watching of some refineries to prevent them from shipping in gasoline of low grade that would not meet the required standard. In several instances cars of gasoline that did not meet the requirement had to be shipped out of the State. During the two years 14,170 samples, representing 158,451,820 gallons of gasoline have been examined.

During the two years samples have been examined and sanitary inspections made as follows:

| | |
|---|---|
| Bottling plant inspections | 410 |
| Bakery inspections | 248 |
| Creamery and ice cream plant inspections | 280 |
| Food samples analyzed | 1,265 |
| Brands of bleached flour inspected | 870 |
| Samples of linseed oil | 373 |
| Miscellaneous samples | 130 |
| Illuminating oil samples | 5,834 |
| Gasoline samples | 14,170 |
| Gallons of gasoline inspected | 158,451,820 |

FINANCIAL STATEMENT OIL AND GASOLINE FUNDS

DECEMBER 1, 1920, TO JULY 1, 1922

GASOLINE INSPECTION FUND

*Receipts*

| | |
|---|---|
| December 1, 1920, to July 1, 1922 | $290,298.52 |

*Disbursements*

| | | |
|---|---|---|
| Expenses, December 1, 1920, to July 1, 1922 | $ 55,195.31 | |
| Transferred to General Fund, State Treasury | 177,000.00 | 232,195.31 |
| Balance in Treasury in Gasoline Fund | | $58,103.21 |

KEROSENE OIL INSPECTION

*Receipts*

| | |
|---|---|
| December 1, 1920, to July 1, 1922 | $91,178.95 |

*Disbursements*

| | | |
|---|---|---|
| Expenses, December 1, 1920, to July 1, 1922 | $44,477.29 | |
| Transferred to General Fund, State Treasury | 32,000.00 | |
| | | $76,477.29 |
| Balance in Treasury in Oil Fund | | $14,701.66 |

Respectully submitted,

W. M. ALLEN, *State Food and Oil Chemist.*

# STATISTICAL DIVISION

This work is showing the most complete results of any period in its existence. It embraces, in addition to the original crop estimates program, statistical work in research, an annual farm census of amazing scope and possibilities, a well developed tobacco sales reporting system, and it now proposes to function in a more effective way by extending agricultural economics data and interpretations to the State College of Agriculture, and to the Extension Service workers. More effective publication of its findings and efficiency in methods of determining its results have been gained. The results are being accepted as authentic, and are being depended on by thousands of recipients. The farmers, and public generally, are no longer heard to raise criticisms, but, rather, are supporting the work and using the information to advantage, just as commercial interests do the data and economic information collected in a similar way for their benefit. The usefulness and value will, naturally, increase. After careful effort, we have secured (gratis) the greatest statistical service reports of the world ($200), by proving that we have valuable information to exchange. An essential electric generator set ($50) was located after considerable search, at a saving of $250. Our franking privilege saves $3,000 annually.

Although our figures are not complete, we have recorded this year: Mail received, 4,692 letters, 28,976 reports and much other matter. There were also sent out 4,295 letters, 114,082 reports and schedules, as well as thousands of other circular letters and pieces of printed matter. A recent order of over 200,000 envelopes was received. These will not last a year.

*Publications*

By resuming the publication of the *Farm Forecaster* as a medium of disseminating statistical information and reports, we can meet calls for facts that we could not begin to supply in an individual way, as was necessary last year. The increasing use of these publications is being made by the State College and the agricultural high school students, to a surprising degree. County superintendents of schools have had their teachers use the crop reports. Many school pupils have written for them.

*Farm Census*

Especial attention is due the results of the annual farm census, which was begun as a voluntary survey, by counties, and which is now an established part of the tax listers' work. A remarkably successful year is about passed in this work. Almost unbelievable results are being found. By intensive efforts the work will be completed months ahead of previous years. The scope of the current year's census is unusually large. Included, besides the usual crops and special acreages are:

Tenant and idle land studies, fertilizers, fruit, pastures, legumes, truck, bees and other economic facts. The most advanced tabulating system, although expensive, has afforded speedy and varied results that would not be possible in any other way. About 165,000 farm tracts were reported on, each covering 34 basic items of information. The results will be of inestimable value and aid to the Extension specialists and agents, as well as to other agricultural interests generally.

*Coöperative Research Office*

The most interesting outlook at this time is the proposed and anticipated development of a research office, in coöperation with the Department of Agricultural Economics at the State College of Agriculture. This plan has been so generally approved of, as the "best thing yet," that your unqualified approval is anticipated. It should not only yield valuable results as a good investment, but will place current basic information at the disposal of our recognized agricultural leaders, who are eager for it.

As outlined in the budget herewith, the assistant statistician, after three and a half years' service, is being assigned to several responsibilities, requiring exacting executive ability. He is long past due the promotion herewith recommended. He is deserving and cannot be replaced by an experienced statist.

*Budget*

The 1923 regular budget of $9,590 calls for the same appropriation as provided for during the past year and a much less average than for the past six months. The census work, budgeted at $893, should be pushed to a speedy completion, to be of most value. The only new project is that mentioned under the "Research Office" paragraph, at $975, and which is generally approved of by all parties concerned and those questioned.

*Radio*

Although it has no relation to our budget, the State College Radio Station could increase our usefulness to a considerable degree if aided by this department. We could more quickly, frequently and completely get and transmit reports than is at present done. It would offer a constantly increasing medium for disseminating various official and relayed reports, which will otherwise not be available. A full-time operation is needed to serve the markets, crop reporting, weather and Extension Service offices. We urge that you support this project.

Respectfully submitted,

FRANK PARKER, *Coöperative Agricultural Statistician.*

# DIVISION OF PUBLICATIONS

The Division of Publications is a part of the Agricultural Experiment Station and Extension Service, conducted jointly by the State College of Agriculture and the State Department of Agriculture. It is the function of this office to edit and mail the letters, forms and other mimeograph and multigraph matter from the various divisions of the Experiment Station and Extension Service; to edit and distribute the Extension publications, the Experiment Station publications, and the publications of the State Department of Agriculture; to supply news items about farming to the press of the State, and to circulate the information found out by the workers in the various divisions to the people of this State.

In addition to this, we do a lot of other service work, in that we have charge of the various cuts used in the different publications, the photographs used for illustrative purposes, and the supplies of stationery which are used, particularly by the extension workers in the field. In our office, also, are maintained the various mailing lists and the multigraph and mimeograph equipment used in the work of the institutions represented.

To get some idea of the services performed for the various divisions during the past year, we have printed for the Farm Demonstration Division, 171,792 letters and forms, of which we have mailed out 159,856; for the Home Demonstration Division, we have printed 79,374 letand forms, and have mailed out 41,704; for the Animal Industry Division, we have printed 103,406 letters and forms and mailed 33,520; for the director of the Experiment Station and Extension Service, we have printed 25,072 letters and forms and mailed 14,842; for the Division of Markets, we have printed 93,744 letters and forms and mailed out 64,636; for the Division of Farm Drainage, we have printed 4,000 letters and forms; for the Division of Entomology, we have printed 21,525 letters and forms and mailed out 16,560; for the Division of Horticulture, we have printed 3,300 letters and forms and mailed out 3,250; for the Food and Oil Chemist, we have printed 33,360 copies of mimeograph matter; for the coöperative marketing work, we have printed 6,200 letters and forms; for the Division of Agronomy, we have printed 3,450 letters and forms; for the Veterinary Division, we have printed 3,085 letters and forms. The printing and mailing of this large amount of mimeograph and multigraph matter has only been made possible by the use of up-to-date equipment, so that we could satisfy the demands for service made on us by the various divisions.

At the same time, however, we have saved considerable money for the various divisions by buying blank paper in quantity and printing the letterhead of the division on this paper. For instance, during the past year we have made 157,000 letterheads for the Farm Demonstration Division, about 84,000 for the Home Demonstration Division, and a

little over 18,000 letterheads for the animal industry Division. This does not include work in November of this year, during which time we printed a large additional supply of these letterheads for these same divisions.

During the year, about 51 articles have been sent to the daily and weekly papers of the State. This does not include a number of feature articles and articles sent to agricultural papers, nor does it also include a great number of press articles sent out during the month of November, at which time the present editor was taking active charge of the editorial work and supplying some two or three articles to the dailies each week, as well as several short articles to the weekly press. Our total, however, shows that 9,265 copies were made of these articles, and supplied to the press of North Carolina.

The Division of Publications also handles all requests for literature coming from farmers in North Carolina and from agricultural workers all over the United States. The time of one person is largely occupied in answering these requests. During the past year our records show that we have mailed out approximately 62,000 departmental publications. This does not include perhaps an even larger number of Experiment Station and Extension Service publications which have been mailed in answer to requests.

The workers in this division have also edited, revised and had published during the year seven publications of the Department, of Agriculture, with a total issue of about 36,000 copies. Of this number, 18,000 were mailed to the various lists. This does not include the publications of the Experiment Station and Extension Service.

One phase of our work which deserves special mention is the handling of paper for the various divisions. Heretofore each division has bought its own paper in small lots, paying high prices on account of the limited purchases. Mr. A. O. Alford and my predecessor, Mr. R. W. Green, worked out a plan whereby this division buys all paper in bulk and issues it at cost to the separate divisions as needed. A strict account is kept as to this stock and whenever it gets low, replacement orders are issued from the divisions according to what has been used. In some cases the Division of Publication has effected a saving amounting to as much as $1.50 per thousand sheets.

In conclusion permit me to state that the Division of Publications has received the hearty coöperation of practically all the workers in the Department of Agriculture organization. The demands made on us have been met as fully as possible under the circumstances and we have tried to render prompt and efficient service in all cases. In closing I would like to commend the efficient work of those connected with me in this division, especially during the time from the resignation of Mr. Green and my active participation in the work. All of the routine activity was carried on in a highly satisfactory and efficient manner.

Respectfully submitted,

F. H. JETER, *Agricultural Editor.*

# MARKETING DIVISION

This report is for the two years ending December 1, 1922, and covers the investigational, extension and service work of the Division of Markets and Rural Organization and North Carolina State College of Agriculture and Engineering, in coöperation with the United States Department of Agriculture under the agreements and plans entered into by these institutions for the conduct of all agricultural work of this kind in the State.

## State Warehouse System

The State Warehouse System has undergone considerable development instant to the progress of coöperative marketing. The System has grown from thirty-two warehouses last year, having an aggregate capacity of 49,050 bales, to seventy-eight warehouses having a total capacity of 212,620 bales.

Of course, this growth has meant considerable expansion of the force handling the State Warehouse System; this force having now been increased to one bookkeeper, three clerks in charge of insurance records, one stenographer, three clerks in charge of files and signing of receipts, these employees being in addition to the State Warehouse Superintendent.

The State Warehouse Superintendent's office not only exercises a very direct supervision of the operation of the warehouses, making constant checks of their affairs; but the office also carries and issues from time to time all supplies in the way of receipts, tags and report forms.

All cotton stored in State warehouses is insured by the State Warehouse Superintendent, this insurance being figured from this office and carried in such manner as to effect very large savings in cost of insurance to the people of the State.

During the past five months the State Warehouse Superintendent's office has been directed by J. M. Workman, who has been acting as State Warehouse Superintendent in the absence of Mr. B. F. Brown, the duly elected Superintendent, who, with the permission of the Board of Agriculture, has been devoting his attention to the Coöperative Marketing Association for a limited time.

## Cotton Classing

Mr. P. H. Hart, Specialist in Cotton Classing, reports that during the season September 1921 to September 1922, the number of bales of cotton classed by our offices was as follows:

Fayetteville, 5,468 bales,
New Bern, 8,883 bales,

Wadesboro, 7,911 bales,
Greenville, 3,309 bales,
Windsor, 3,150 bales (closed February 1, 1921),
Raleigh, 7,236 bales.

There was little demand for cotton classing offices for the 1922-23 seasons because of the organization of the Coöperative Marketing Association with its 30,000 members in North Carolina. Only two offices, therefore, have been operating outside of Raleigh. The New Bern office from September to December 1st, has classed 2,709 bales and the Fayetteville office, 9,348 bales for the same period.

Through a coöperative arrangement, the Cotton Association is now furnishing ideal quarters for the classing work and all cotton samples submitted, regardless of whether the owners are members of the Association, are classed in the same room by the same classers. At present there are eight classers and five helpers busily engaged in this work, but five of these classers are engaged for only the rush season. During September, October, and November at total of 74,000 bales have been classed for the Association and 5,872 for non-members. This makes a total of 114,638 bales classed during the past fiscal year, December 1, 1921 to December 1st, 1922.

## WAREHOUSE CONSTRUCTION

During 1921 the numerous inquiries received from all over the State indicated that interest in cotton warehouse developments was active even though construction projects were held back by reason of financial stringency and later rise in the price of cotton. By reason of this situation and the merely formative stage of the Marketing Association the services of our engineer, Mr. J. M. Workman, were directed largely toward a survey of the State aimed to determine the actual and relative advantages of 300 towns as marketing and storage centers for cotton. This study is designed as a guide to the marketing association and to the most intelligent application of the State aid and loan funds. It takes into consideration existing trade connections, variety and density of cotton production and its distribution, highways and transportation facilities, financial institutions, and fire protection ratings. It is recognized that development in intelligent and truly economical production must reinforce all marketing accomplishments.

The two warehouses that were constructed in 1921 were at Kings Mountain and Dunn. They had an aggregate capacity of 10,000 bales. Both were constructed with the aid of the State loans and in accordance with plans engineered by the Division of Markets.

During the past year there has been an increase in the interest evidenced in the cotton storage business and a number of warehouses have been constructed. The warehouse department engineer has furnished plans for the construction of warehouses at Goldsboro, Norlina,

Fayetteville, and Raeford, having an aggregate capacity of 26,000 bales. These warehouses are now nearing completion.

The work of supplying engineering services has been conducted by Mr. J. M. Workman, Warehouse Engineer, who has also concluded the preparation of the economic storage survey designed to determine the most economical development of storage facilities in the State. This work, however, has been carried on to a lesser degree by reason of the fact that for the past five months Mr. Workman has been serving as State Warehouse Superintendent.

### WAREHOUSE ORGANIZATION

Mr. T. B. Parker has had charge of the organization work in connection with warehouse construction. On account of financial conditions, the year 1921 was one of little activity in warehouse work. The past year has seen improved conditions but the uncertainty as to the steps the Cotton Growers' Coöperative Association would take in regard to cotton storage warehouses held the work in abeyance for a considerable time.

During 1922, Mr Parker has visited a number of places in the interest of improved warehousing facilities. Among these are the following: Nashville, Whitakers, Conetoe, Benson, Norlina, Warrenton, Warren Plains, Raeford, Stantonsburg, China Grove, Salisbury, Kelford, Scotland Neck, Mount Olive, Goldsboro, Kinston, Greenville, Farmville, Macclesfield, Pinetops, Weldon, Cleveland, Mount Gould and Seaboard. He was called to Tyron where steps were taken to get into coöperative dairying; to Pittsboro, Rutherfordton, Elm City and Poplar Grove and also appeared on the program at the District County Agents Conferences at Wilmington and Statesville.

### LIVE STOCK

Because we were without the services of a Specialist in Marketing Live Stock during 1921, the report on this phase of our work is limited to the past year, or since Mr. V. W. Lewis has been connected with the Division of Markets in this capacity. There are so many projects in livestock work deserving immediate attention that it is impossible for the one specialist to take care of the needs properly.

After the war the obligations the farmers had to meet caused many herds and flocks to be sacrificed. In many cases the younger animals were sold on the market in preference to older ones because they would bring more money. Later, the older animals were forced on the market because they were no longer fit for breeding purposes.

This deflation in prices and depletion of good breeding herds has to some extent reacted causing the price of market animals during the past year to advance as will be shown from comparison of prices quoted from "Livestock Markets:"

| | Oct. 23, 1922 | Oct. 24, 1921 | Per cent advance |
|---|---|---|---|
| Top Steers | $13.55 | $ 8.60 | 41.1 |
| Top Yearlings | 12.00 | 11.25 | 15.5 |
| Feeder Cattle | 8.00 | 6.75 | 18.5 |
| Top Hogs | 9.75 | 8.30 | 17.4 |
| Top Lambs | 14.60 | 8.75 | 66.8 |
| Feeder Lambs | 14.75 | 7.75 | 90.3 |

## HOGS

A year ago we found that very little coöperative marketing of hogs had been done for the past two years. In fact, only Iredell County had shipped any hogs in this manner during that time.

The Office of Swine Extension was getting some excellent feeding demonstrations going in a few counties over the State and since these demonstrations could be made the basis of making up coöperative carload shipments we gave assistance whenever possible in encouraging this work and handling these coöperative shipments.

This work has grown during the year so that thirteen counties produced and sold coöperatively 33 cars of hogs fed under the direction of the Office of Swine Extension and sold through this office. Most of this work has been done in the Eastern part of the State in cotton growing sections and no doubt the invasion of the boll-weevil has had considerable to do in preparing the minds of the farmers in this section for this hog work.

Most southern farmers who produce surplus hogs for the market sell these hogs during the months of November, December and January. Our plans have been to get North Carolina farmers interested in selling their surplus hogs on the high markets.

Most of the shipments, made in the spring of 1922, were sold during the month of March. Summer shipments were made during the months of June, July and August, most of them going to Richmond, Va., where they brought 10 1-2 to 11 3-4 cents per pound. In many instances the carload shipments were sold for 9 1-2 to 11 cents per pound f. o. b. shipping point.

In marketing the hogs of these sales it has been our purpose to develop as much as possible the local markets within the State. In this we have been rather successful in that we have sold a number of cars of these hogs to Hooker and Co., Kinston and the Charlotte Packing Co., Charlotte.

The hogs fed and marketed under the instructions furnished through the Agricultural Extension Service have been of such good quality and finish that we have been able to receive top prices for these hogs. We hope to develop this work to the extent that we will be able to get a very large part of the surplus hogs of the State of such quality and finish that they will sell as well as Corn Belt fed hogs and if the farmers can be taught to get their hogs on the market at the right time, there is no reason why the hog industry in North Carolina should not grow

and be developed on a very profitable basis. Charts which have been prepared by this office show that over a twenty year period the lowest prices are in November, December and January when the bulk of the surplus hogs in North Carolina are sold.

### LAMBS

In view of the fact that lambs sold for a much better price than was anticipated, farmers were encouraged to sell their early lambs on local markets where they were receiving 15 to 20 cents per pound gross weight rather than wait until later when the coöperative shipments would be ready with a chance of taking less money. These prices were very satisfactory to the producers and it enabled them to sell their lambs when of the right weight rather than selling them when the smaller ones were ready.

It is interesting to know that spring lambs sold on the Chicago market at a price (26 cents per pound) higher than at any time during the war, the highest price being at this time 25 cents per pound gross. This price for mutton, together with the splendid price received for wool during the year, is causing a greater development of the sheep industry in this State.

### *Wool*

Wool could hardly be sold for any price in 1921. During the winter, prices began to advance. As usual, the local wool buyers received the information before the farmers had it, and contracted for a large part of the wool before the farmers were aware of the advance in price. To assist the farmers in getting better prices than offered by these local wool buyers, arrangements were made for a number of wool pools in this State, making the county the unit. Three hundred and one farmers consigned 43,789 pounds of wool, and received an average price of $0.309 per pound.

We were assisted in grading the wool by a representative of the Bureau of Agricultural Economics, Washington, D. C. A considerable number of buyers were interested in these sales, but a large part of the wool was bought by the Chatham Manufacturing Co., of Winston-Salem, N. C.

Very few counties in Western North Carolina were active in this plan. The wool pool held in Jackson County, also the ones held in Avery and Watauga counties were independent of the ones just mentioned, and approximately 20,000 pounds of wool was sold for 36 cents per pound, which was 5 to 8 cents per pound more than the farmers were offered at the time of the sale.

Our plans are to continue the wool marketing project for 1923 in the same manner as this year, and the indications are that we will have no trouble in getting a much larger amount of wool consigned.

### *Cattle*

There has been little interest in feeding cattle in this State during the past two years, as a result of the high prices of feed. It seems that the winter of 1922 would be a better time for feeding cattle, due to the fact that the price of feed and the price of cattle are more in line; but the farmers have manifested very little interest in feeding cattle this season.

Arrangements were made for holding a coöperative cattle sale at Spruce Pine, to include the counties of Yancey, Mitchell and Avery. Nearly 300 head of cattle were consigned and sold at auction to the highest bidder at very satisfactory prices. This is the second coöperative sale held at this point. The first one was held in September, 1920.

Unfortunately, the better class of cattle in these three counties was contracted for before it was decided to hold a coöperative sale this season. Our plans are to continue the coöperative sale project another year, as the farmers are very much pleased with the results received.

We have made a number of shipments of cattle to Richmond and Baltimore markets this past season.

### *Cheese*

North Carolina is producing annually around 400,000 pounds of cheese. This cheese is produced in Western North Carolina, in a section where the roads are in bad condition, thereby making market facilities very poor. Practically all the output of these cheese factories in the State since they were established has gone to Swift & Co. and Armour & Co., the prices being based on the lowest Plymouth, Wis., prices.

The producers furnishing the milk for these cheese factories have felt for some time that they were not receiving enough for it. An effort has been made by this Division to help create a market in North Carolina and adjoining states for North Carolina cheese. Through reliable brokerage firms, considerable of this output has been distributed direct to wholesale grocers who are glad to buy North Carolina cheese. In this way the price per pound received for the output of cheese in North Carolina has been increased.

The great trouble with this particular industry at present has been that no storage facilities have been provided, and during the time when most of the output is being made during the summer months, it is forced on the market at a time when cheese is lowest in price for the year.

### *Eggs*

In the spring of 1922 an effort was made to assist in marketing eggs. It was soon found that the supply was much less than the demand for good eggs and that it was impossible to satisfactorily market poor eggs in this State.

What is badly needed in regard to this industry is that the amount furnished the market be properly candled and graded before being put on the market. There is a splendid market for more eggs than are produced in this State when this is done.

### *Farm Fencing Campaign*

In view of the fact that Eastern North Carolina is to change its methods of farming, using considerable areas of land now devoted to cotton in producing foods and feed crops (and necessarily more livestock), it is very essential that this section of the State build more pastures and do more fencing.

Arrangements are being made with the various hardware dealers in those counties who sell products of the American Steel and Wire Co., New York, to sell farm fencing material at cost to the farmers plus 5 per cent for handling through the dealer.

In this plan the farmers are to pay cash and to receive shipments from the car.

## FRUITS AND VEGETABLES

### *Organization*

The past two years have found the fruit and truck growers unusually eager to coöperate with each other. This has been especially true since the passage of the recent Coöperative Marketing Act, as it is now possible to perfect an organization that will be able to weather hardships. The former act permitted no really binding features, and most of the old associations that were able to survive have been reincorporated in order to gain the advantages of the recent act. In this transformation they were assisted by Mr. Gorrell Shumaker, who is handling the marketing of fruits and vegetables.

The greatest activity has been among the sweet potato growers. Here the Division of Markets has worked in close coöperation with the Division of Horticuture. Over a dozen local sweet potato growers' associations, with their subsidary storage coöperations, have been formed. Several of these have then been welded into a state federation, which has for sale this year around 70,000 bushels of potatoes. About a dozen complicated legal forms, including by-laws, contracts and various forms of agreement, have been prepared as a standard for use by these organizations. In the preparation of these we have had the assistance of Mr. Aaron Sapiro.

Considerable attention has been devoted to local marketing problems. An attempt was made to assist the farm agent and the home agent in starting a city market at Charlotte, but the venture has not yet materialized, because of so little local support. The coöperative marketing stall in the Durham market, and the curb markets at Greensboro, Fayetteville and Lumberton have been successful. A circular entitled "Market Requirements for Fruits and Vegetables" was pre-

pared for use on these local markets. The latest development is the coöperative stall in the Raleigh market. Several days were spent in assisting with the planning of this venture and the neat arrangement of its products, together with aid in standardizing grades for the various commodities. A study is now being made of the situation at Oxford, with a view of making recommendations for the improvement of local marketing conditions there.

*Market News Service*

The coöperative arrangement between this Division and the Federal Bureau of Agricultural Economics for handling market news service has been continued. Under this plan, the Division of Markets usually bears most of the local expense and the Washington office provides for collecting the information on the consuming markets. During the shipping season, strawberry reports were mailed from Chadbourn; potato reports from Chadbourn, and peach reports from Aberdeen. Melons should, by all means, be added to this list, if sufficient funds are available.

*Standardization of Grades*

Growers everywhere are endorsing the standardization program. More calls for grading demonstrations are received than can be cared for with the limited force at hand. The strawberry and sweet potato grades remain unchanged, and only slight changes have been made in the official grades for potatoes and apples. Beginning with the coming season, there will be official grades for cucumbers and peaches, as the two years of experimental work with these grades among our growers have met with so much favor among both the trade and the producers. Grades will be recommended for other commodities as fast as time can be spared from the present projects for the investigational work necessary.

AGRICULTURAL STATISTICS

*Crop Reporting Service*

This work is showing the most complete results of any period in its existence. It embraces, in addition to the original crop estimates program, statistical work in research, an annual farm census of considerable possibilities, a well developed tobacco sales reporting system, and it now proposes to function in a more effective way by extending agricultural economics data and interpretations to the State College of Agriculture and to the Extension Service workers. More effective publication of its findings and efficiency in methods of determining its results have geen gained. The results are being accepted as authentic, and the farmers and the public generally are supporting the work and using the information to advantage.

Mr. Frank Parker, agricultural statistician, reports that incomplete records for the year indicate that 4,692 letters and 28,967 reports were

received through the mails. At the same time, they mailed out 4,295 letters and 114,082 reports and schedules, in addition to the thousands of circular letters and pieces of printed matter.

### *Publications*

By resuming the publication of the *Farm Forecaster* as a medium of disseminating statistical information and reports, it has been possible to meet the many calls for facts which could not have been supplied through individual letters, as was necessary last year. State College and Agricultural High School students are increasing their use of these publications to a surprising degree. In many instances county school superintendents have had their teachers make use of the crop reports.

### *Farm Census*

Considerable recognition is due to the farm census, which was begun as a voluntary survey by counties, and which is now an established part of the tax listers' work. By intensive efforts this year, the work will be completed months ahead of the usual time, despite the increased scope of the work. Besides the usual crops, there have been included tenant and idle land studies, fertilizers, fruit, pasture, legumes, truck, bees, and other economic facts. Reports have been secured on 165,000 farm tracts, each report covering 34 basic items of information. The results should be of great value to extension workers and agricultural interests generally.

## CREDIT UNIONS

Like all other organizations or institutions dealing with finance, the credit unions of North Carolina are emerging from a period of financial stringency unequaled in history. In spite of this, they are generally reported in satisfactory condition.

Mr. R. O. Moen, who succeeded Mr. Fred R. Yoder as specialist in credit unions, reports that at present there are twenty-nine credit unions incorporated in the State. They are located in fifteen counties in various parts of the State, and are proving to meet the needs of the different types of farmers.

Most of the colored credit unions are operated in the cotton and tobacco growing sections, where they take the form of coöperative purchasing societies. In following out the law, their loans are made for productive purchases only. Any member wishing a loan fills out an application blank furnished by the secretary-treasurer, stating the amount of the loan and the length of time desired, the purpose for which the loan is to be used, and the kind of security offered. The purposes for which loans are made include the following: To help build barns and houses; for fertilizers, livestock and farm machinery, seeds, food and feed supplies, and to pay off old debts incurred for productive purposes. The common interest rate charged is 6 per cent.

The credit unions organized among the white farmers take the form of coöperative banks. Deposits are always encouraged. They are added to the cash received from the sale of stocks to form a cash fund from which loans are made. Here, too, the secured loans are made for productive purposes, to persons who can and will repay the loans at maturity. Banking accommodations are thus given to persons with surplus funds and savings, as well as to the persons wishing short-time loans, who have not access to regular banking channels.

During the early part of the year the work of this office was directed toward expansion—five credit unions having been formed. Some attention was given to the improving of the accounting of the credit unions when the regular audits were made.

Since September 1, the work has been directed toward placing the weaker credit unions on a firmer financial and business basis. This is being accomplished by conducting analytical audits of the books and directly helping the secretary-treasurers of the credit unions.

Respectfully submitted

B. F. BROWN,
*Chief of Division of Markets and Rural Organization,*
*State Superintendent of Warehouses.*

# FINANCIAL STATEMENT

## Summary of Disbursements for Last Two Fiscal Years, Ending June 30, 1921, and June 30, 1922

### Executive Office

| *Distribution* | *1921* | *1922* | *Total* |
|---|---|---|---|
| Salaries | $10,343.58 | $8,595.14 | $18,938.72 |
| Inspection | 13,355.45 | 13,589.32 | 26,944.77 |
| Board and committee meetings | 3,064.20 | 1,811.98 | 4,876.18 |
| Tags | 18,924.55 | 4,375.83 | 23,300.38 |
| Postage, stationery, telephone, etc. | 1,012.39 | 1,131.94 | 2,144.33 |
| Freight, express and drayage | 92.71 | 61.14 | 153.85 |
| Heat, light and water | 852.47 | 1,587.91 | 2,440.38 |
| Incidentals | 53.95 | 25.00 | 78.95 |
| Library and subscriptions | 89.75 | 72.05 | 161.80 |
| Furniture and fixtures | 8.45 | 64.10 | 72.55 |
| Travel | 129.14 | 85.39 | 214.53 |
| Building and repairs | 216.50 | 1,863.23 | 2,079.73 |
| Contingent | 1,909.45 | 1,129.82 | 3,039.27 |
| Publications | 9,772.65 | 1,543.34 | 11,315.99 |
| State Fair | 826.29 | 3.00 | 829.29 |
| Fairs and exhibits | 9,042.70 | ---- | 9,042.70 |
| Pictures for rural schools | 244.00 | ---- | 244.00 |
| Emergency help | 523.09 | ---- | 523.09 |
| Farmers' convention | 744.00 | 800.00 | 1,544.00 |
| Handbook | ------ | 239.00 | 239.00 |
| Six warehouse models | 325.00 | ---- | 325.00 |
| Lights and water, Iredell Farm | 1,500.00 | ---- | 1,500.00 |
| Book prizes | 48.72 | ---- | 48.72 |
| Biscuit contest | ------ | 20.00 | 20.00 |

### Analytical Division

| | | | |
|---|---|---|---|
| Salaries | 18,574.94 | 21,005.00 | 39,579.94 |
| Apparatus and reagents | 3,346.87 | 2,755.23 | 6,102.10 |
| Travel | 373.29 | 808.10 | 1,181.39 |
| Office expenses | 883.74 | 1,013.23 | 1,896.97 |

### Farmer's Institutes

| | | | |
|---|---|---|---|
| Expenses | 322.88 | ---- | 322.88 |

### Animal Industry Division

| | | | |
|---|---|---|---|
| Salaries | 15,458.69 | 15,495.78 | 30,954.47 |
| Expenses | 21,837.81 | 21,587.42 | 43,425.23 |

### Test Farms

| | | | |
|---|---|---|---|
| Buncombe Farm | 8,980.14 | 8,951.61 | 17,931.75 |
| Pender Farm | 24,890.18 | 33,000.75 | 57,890.93 |
| Edgecombe Farm | 11,021.21 | 8,988.74 | 20,009.95 |
| Iredell Farm | 9,535.54 | 8,571.03 | 18,106.57 |
| Granville Farm | 8,851.93 | 6,046.34 | 14,898.27 |
| Washington Farm | 8,506.85 | 6,447.18 | 14,954.03 |
| Miscellaneous | ------ | 48.75 | 48.75 |

### VETERINARY DIVISION

| *Distribution* | *1921* | *1922* | *Total* |
|---|---|---|---|
| Salaries | 9,016.61 | 9,100.00 | 18,116.61 |
| Sanitary | 2,278.39 | 1,713.62 | 3,992.01 |
| Tuberculosis work | 5,019.82 | 5,624.32 | 10,644.14 |
| Hog cholera work | 6,107.43 | 2,581.92 | 8,689.35 |
| Serum | 40,050.26 | 27,232.08 | 67,282.34 |
| Quarantine | 21,824.23 | 11,141.08 | 32,965.31 |

### MUSEUM

| | | | |
|---|---|---|---|
| Salaries | 6,249.84 | 6,410.32 | 12,660.16 |
| Expenses | 508.29 | 442.22 | 950.51 |

### CROP STATISTICS

| | | | |
|---|---|---|---|
| Salaries | 1,500.00 | 625.00 | 2,125.00 |
| Expenses | 10,788.02 | 13,015.89 | 23,803.91 |

### PURE FOOD DIVISION

| | | | |
|---|---|---|---|
| Salaries | 4,537.46 | 4,494.45 | 9,031.91 |
| Expenses | 1,016.73 | 1,248.95 | 2,265.68 |

### ENTOMOLOGY DIVISION

| | | | |
|---|---|---|---|
| Salaries | 11,515.37 | 12,133.30 | 23,648.67 |
| Field inspection | 1,674.83 | 1,345.19 | 3,020.02 |
| Office and laboratory | 628.42 | 582.03 | 1,210.45 |
| Emergency | 998.04 | ----- | 998.04 |

### DIVISION OF HORTICULTURE

| | | | |
|---|---|---|---|
| Salaries | 7,412.35 | 7,859.43 | 15,271.78 |
| Equipment and supplies | 303.97 | 344.99 | 648.96 |
| Travel | 1,205.76 | 769.56 | 1,975.32 |
| Horticulturist's salary | 1,307.14 | ---- | 1,307.14 |

### BOTANY DIVISION

| | | | |
|---|---|---|---|
| Salaries | 8,291.57 | 7,779.10 | 16,070.67 |
| Expenses | 1,351.57 | 1,041.56 | 2,393.13 |

### DRAINAGE DIVISION

| | | | |
|---|---|---|---|
| Salary | 1,629.96 | ---- | 1,629.96 |
| Expenses | 652.51 | 90.59 | 743.10 |

### DIVISION OF SOIL WORK AND AGRONOMY

| | | | |
|---|---|---|---|
| Salaries | 11,763.79 | 11,741.68 | 23,505.47 |
| Soil work | 4,754.02 | 3,170.78 | 7,924.80 |
| Agronomy | 1,906.86 | 1,484.66 | 3,391.52 |

### TOBACCO WORK

| | | | |
|---|---|---|---|
| Salary | 499.92 | 500.00 | 999.92 |
| Expenses | 766.96 | 526.47 | 1,293.43 |

### MARKETS AND RURAL ORGANIZATIONS

| | | | |
|---|---|---|---|
| Salaries | 25,071.87 | 16,936.52 | 42,008.39 |
| Expenses | 7,745.46 | 5,261.41 | 13,006.87 |
| Warehouse bond | 1,500.00 | ---- | 1,500.00 |

### LIME WORK

| | | | |
|---|---|---|---|
| Expenses | 13,720.68 | 4,465.51 | 18,186.19 |

FARM ENGINEERING

| *Distribution* | *1921* | *1922* | *Total* |
|---|---|---|---|
| Salary and expenses | 2,678.81 | ---- | 2,678.81 |

TEST FARM DIRECTORS AND AGRICULTURAL EDITOR

| | | | |
|---|---|---|---|
| Salaries | 5,416.65 | 6,000.00 | 11,416.65 |

MULTIGRAPH

| | | | |
|---|---|---|---|
| Salary | 574.92 | 575.00 | 1,149.92 |

COOPERATIVE DEMONSTRATION

| | | | |
|---|---|---|---|
| Expenses | 13,918.53 | 4,002.12 | 17,920.65 |

PAINT WORK

| | | | |
|---|---|---|---|
| Expenses | ------ | 1,677.71 | 1,677.71 |

PLANT DISEASES

| | | | |
|---|---|---|---|
| Salary | 583.31 | ------ | 583.31 |
| Expenses | 34.65 | 150.06 | 184.71 |

JANITORS

| | | | |
|---|---|---|---|
| Salaries | 1,430.00 | 1,545.00 | 2,975.00 |
| Total | $443,898.11 | $345,329.87 | $789,227.98 |

## RECEIPTS

JULY 1, 1920—JUNE 30, 1922

| *Distribution* | *1921* | *1922* | *Total* |
|---|---|---|---|
| Fertilizer tags | $139,447.15 | $184,906.98 | $324,354.13 |
| Meal | 26,889.91 | 22,179.19 | 49,069.10 |
| Feed | 37,008.17 | 43,494.36 | 80,502.53 |
| Seed licenses | 2,075.00 | 2,750.00 | 4,825.00 |
| Condimental feed | 1,820.00 | 960.00 | 2,780.00 |
| Serum | 45,948.86 | 27,782.68 | 73,731.54 |
| Irregularities | 699.22 | 469.30 | 1,168.52 |
| Test farms | 26,453.14 | 29,426.85 | 55,879.99 |
| Linseed oil | 1,616.76 | 1,699.69 | 3,316.45 |
| Bleached flour | 5,820.00 | 6,405.00 | 12,225.00 |
| Bottling plants | 2,010.00 | 571.67 | 2,581.67 |
| Animal Industry farm | 4,131.37 | 1,467.87 | 5,599.24 |
| Lime | 9,729.46 | 4,696.46 | 14,425.92 |
| Legume inoculation | 1,309.74 | 1,517.44 | 2,827.18 |
| Warehouses | 298.73 | 276.80 | 575.53 |
| Refunds | 370.19 | 455.06 | 825.25 |
| Seed tags | 2.35 | 1,278.56 | 1,280.91 |
| Cleaning and testing seed | 81.82 | 5.25 | 87.07 |
| Posters | 4.15 | ------ | 4.15 |
| Oil and Gasoline Division | 3,000.00 | 6,000.00 | 9,000.00 |
| Bakery licenses | 250.00 | 30.00 | 280.00 |
| Cows sold — quarantine | 115.40 | ------ | 115.40 |
| Grape work—Pender Farm | 94.67 | ------ | 94.67 |
| Legislative appropriation | 50,000.00 | ------ | 50,000.00 |
| Protested check | 31.34 | ------ | 31.34 |
| Payment on marl plant | 2,000.00 | ------ | 2,000.00 |
| Sale loose cotton samples | 500.00 | ------ | 500.00 |
| Inspection fee — markets | 4.00 | ------ | 4.00 |
| Paint | ------ | 9,446.14 | 9,446.14 |
| Ice cream | ------ | 355.00 | 355.00 |
| Interest | 295.22 | 834.20 | 1,129.42 |
| Total | $362,006.65 | $347,008.50 | $709,015.15 |

## DIVISION OF FOOD AND OIL INSPECTION

### FINANCIAL STATEMENT FOR 19 MONTHS ENDING JULY 1, 1922

#### GASOLINE INSPECTION FUND

*Account with State Treasurer*

| | | |
|---|---|---|
| Balance in State Treasury Nov. 30, 1920 | | $ 1,584.07 |
| Receipts Dec., 1920, to July, 1922, deposited State Treasury | | 290,298.52 |
| Expense warrants, same period | $ 55,195.31 | |
| Warrants State Treasurer to General Fund | 177,000.00 | |
| Balance in treasury Gasoline Fund | 59,687.28 | |
| | $291,882.59 | $291,882.59 |

#### ILLUMINATING OIL INSPECTION FUND

*Account with State Treasurer*

| | | |
|---|---|---|
| Balance in State Treasury Nov. 30, 1920 | | $ 1,490.36 |
| Receipts, Dec., 1920, to July, 1922, deposited State Treasury | | 91,178.95 |
| Expense warrants, same period | $44,477.29 | |
| Warrants State Treasurer to General Fund | 32,000.00 | |
| Balance in Treasury, Illuminating Oil Fund | 16,192.02 | |
| | $92,669.31 | $92,669.31 |